SINCLAIR

QL WORLD

Every month £1.25 December 1987
DENMARK DKR 40.00
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SWITZERLAND SFR 6.50

The U.S. connection

Psion revisions

Super-fast screen handling

EPROMs
– the works

Introducing QTALK

TEXT TO SPEECH IN A FLASH

PRICE	
Qtalk	£75.00
VAT	£11.25
Post/Packaging	£ 2.25
Total	£88.50

Qtalk Applications

1) **Health**
   - a viable solution to speech impairment/impediment
   - allows the blind to write documents and programs
2) **Education**
   - an excellent tool for teaching the relationship between the written and the spoken word
   - a valuable aid to those assisting the dyslexic or for students with reading problems
   - an amazing new method for teaching or learning the translation of one language to another
   - touch typing made easy with keyboard echo
3) **Industry**
   - enables verbal output of readings/warnings from independent peripherals. (BUS, IEEE, RS232 etc)
   - can be used to give instructions to an operator
   - could be set up as an answerphone or entryphone
4) **Entertainment**
   - allows the user to verbally list programs while checking them against a hardcopy listing
   - can be made to hum musical tunes
   - provides a whole new dimension to computer games

Hardware Features

RS232C, Selectable baud rate, DCE or DTE
- will operate on any computer with an RS232 port
- at any standard baud rate
- does not tie up the expansion port

Three adjustable presets:
- allows adjustment of Volume, Pitch and Pitch range (16 levels)

Black Eurocard enclosure, QL plug, power lead, socket and serial cable
- simply plugs in between your power supply and QL
- maintains the integrity of your computer system

(Note. CST Thor version is powered through the serial lead)

Software Features

Full 68000 Text To Speech software incorporating 16 levels of pitch.
- lightning fast conversion of any string into speech
- any multi syllable word may be split, with different syllables spoken at differing levels of pitch, allowing intonation
- 20K of code. Will work on standard (128K) machine and Thor

Built in Exception Table (BET)
- certain words defy all logic and no amount of rules can cater for these. Therefore, their pronounciation has been permanently set in an exception table. eg 'thorough', 'ghoti', 'Lbytes', 'flp1'

Size selectable User Exception Table (UET)
- Users can set up their own table of any size and fill it with their own words/pronounciations. This overrides words in the built in table therefore allowing translation of languages. This table can be saved and reloaded for later use.

Over 400 rules to convert text to speech.
- If the word or string is not found in either table it will be pronounced via a sophisticated set of rules.

Full Device driver implementation.
- a new device called 'QTK' is added to the QL's list of devices. This means that you can use all of the built in basic keywords to send information to QTALK. eg PRINT, LIST, DIR, COPY etc. and also use QTALK with other computer languages (PASCAL, FORTRAN etc)
- a set of clever superbasic extensions is also included to make QTALK a breeze to use
- may be set to pronounce or ignore punctuation

Multitasking screen editor
- can be called up any time to set up and add, alter or delete words from the User exception table. Comprehensive on screen help.
- Hopefully the last word in QL clocks — talking time and date

Many more thoroughly documented features

ALIEN HIJACK

The year is 2003 and you are working on the S.P.C. Forward, as ship's engineer. On the 23rd day you are attacked by an alien space ship and all hell breaks loose. You must regain control of your ship, against some mighty tough opposition.

The first TALKING game for the Sinclair QL. Possibly the most amazing QL graphics seen to date

- 3D graphics
- Full 68000 code
- 192 colour screens
- fast, dynamic, challenging
- talking hero and aliens

Note. Alien Hijack does not require QTALK to run but it certainly makes it a lot more fun. Works on a 128K QL.

PRICE	
Alien Hijack	£15.00
VAT	£ 2.25
Post/Packaging	£ 1.00
Total	£18.25

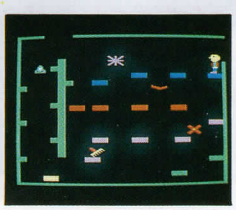
PUZZLE MANIA

Your mission, should you decide to accept, is to journey about the danger ridden cells of Maniaville to retrieve the lost loot of Lawless Lenny. Several obstacles will attempt to thwart your progress and only the smartest gamer will survive.

The second TALKING game for the Sinclair QL

- full 68000 code — 40 colour screens — fast, arcade action
- spoken clues to help you win (if you are good enough)
- Truly addictive challenge

Note. Puzzle Mania can operate without QTALK but is much more fun with it.



PRICE	
Puzzle Mania	£10.00
VAT	£ 1.50
Post/Packaging	£ 1.00
Total	£12.50

Special Introductory Offer

Buy QTALK, PUZZLE MANIA and ALIEN HIJACK and receive £5.00 discount pre VAT total

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Address _____

Please rush me _____

for my **QL/THOR** (cross out one which does not apply)
with software on 3½" **disc/mdv** (cross out one which does not apply)

I enclose a **bank cheque** for £ _____
or please debit my **Access/Visa card** (cross out one which does not apply)

Card number |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Expiry date _____ **Signature** _____

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NEXT MONTH

BATTLE OF THE KEYBOARDS
After a long wait it looks as if the promise of a really good outboard keyboard for the QL will finally become reality – not once, but twice. Ron Massey reviews new keyboards from Schon and Sandy, and likes them both.

FLASHBACK
Sector Software has produced a new and user-friendly system for files independently of the conventional database format. Ron Massey finds that it has some of the advantages of a database and some of a text editor or wordprocessor.

TURBO V2.0

DP Classic

THOR COMPATIBLE

"Dramatic . . . . bug fre e . . . . an excellent program . . . a great advance on Supercharge . . . . more capable (than the latest version of QLiberator) . . . . the fastest SuperBASIC compiler so far . . . . mind-bending . . . . takes SuperBASIC and the QL . into a new era . . . . With TURBO we should start to see programs which are unthinkable on any other small micro"

Upto 100X spee dup on BASIC! QL WORLD, April 1987

☆ Supremely fast – even QL World's independent benchmarks, which do not use **TURBO**'s speed-optimisati on options (which give a further 100% – 150% speed increase), show a 230% (yes – TWO HUNDRED AND THIRTY!) speed increase over the latest version of QLiberator. We can demonstrate speed improvements that are far greater, and the speed of con pilation itself is typically 100% + more than on QLiberator.

☆ Supremely concise – ever n QL World's size benchmarks, which do not use **TURBO**'s size optimisation or diagnos tics off options (which yield a further 40% saving in code space), show that **TURBO** g enerates more concise tasks than QLiberator!

☆ Supremely compatible – T**URBO** compiles virtually anything you care to throw at it. Full auto-corrector built in, t sks interpreter bugs in its stride, warns you if you've been too naughty.

☆ Supremely easy to use - - a beautiful front-end, on-screen help, instant abort, no LENSLOK, window adjus table during compilation, multitasks while compiling, adjustable buffer size/win dow copying/DATASPACE from front-window, user configurable to avoid boring i keybashing, adjustable report file (to screen/printer/file etc.) in full or condensed format, e tc.

☆ Supremely flexible task co mmunications – use PRINT and INPUT to communicate between any number of multitasking jobs – even arrays can be passed, and channels can be shared! Option strings can be passed as parameters of EXECUTE.

☆ Supremely free from restr ictions – you can use procedures or functions in any task from any other task! General ise tasks as large as the QL's 640K RAM – or go down the modular route (we supply a program to help you) and instantly link any number of modules.

☆ Supremely Servile (!) – **TURBO** lets you choose between switching diagnostics on/off (off = shorter code), and between setting optimisation to global speed/localised speed (on a statement block basis) ★ size ★ size with localised speed ★ none, a total of 15 options. You are in the driving seat. If you slip up, we give you a report that pinpoints your mistake, exact to the character!

☆ Supremely feature-filled: Virtual arrays, rubber arrays, implicit datatypes (accelerated, fully re-entrant integer FOR loops and integer/STRING SELECT on all QL s), full WHEN – ERROR trapping of any error on any QL version to a single point (error handlers – you can have any number of them, hierarchically laid out – have full access to line and error numbers, and you can RETRY or CONTINUE RESTART as you choose) even when in another task, parameter passing by reference as well as by value, 9 digits of displayed accuracy, etc.

☆ Supremely powerful **TOOLKIT** included, with **ONE HUNDRED AND EIGHTY (!!!)** really useful commands, utilities and functions for the BASIC programmer. There is no space to even begin to list them – suffice it to say that **TURBO TOOLKIT**'s most 'comprehensive' rival has little more than half as many features. The **TOOLKIT** (which is RAM based) is designed to complement existing toolkits (e.g. the Supertoolkit) as far as possible.

☆ Supremely documented – a **THREE HUNDRED AND FIFTY A4 PAGE,** lucid, illustrated user encyclopedia.

☆ Supremely generous – there are no royalty restrictions on **TURBO**'d programs.

The TURBO System costs £99.95 COMPLETE

TURBO IS BRILLIANT. PRESS COMMENT FROM EVERY SOURCE IDENTIFIES IT AS THE MOST OUTSTANDING BASIC COMPILER FOR ANY MICROCOMPUTER.
The TURBO TOOLKIT is perfectly usable as a stand-alone toolkit, and costs just £29.95. This amount will be credited if you subsequently purchase THE TURBO SYSTEM.

"You are getting good value, and there is a lot more . . . TURBO TOOLKIT is a comprehensive product which will not leave you wondering where your money went – it offers a wide range of facilities to everyone (whether or not they own a compiler)!!" . . . QL World, December 1986.

TURBO AND TURBO TOOLKIT V2.0 - FASTER AND MORE POWERFUL THAN EVER BEFORE!!

V2.0 is the ultimate ver sion of the TURBO SYSTEM, incorporating all the features you have been waiting for. Never before has the system been more flexible and easy to use, with a totally redesigned user interface giving you even greater control over the compiled program. You can now fine-tune throughput and output in the following ways:
* Code address size (16bit or 32bit) * Object size (>64K, <64K) * Optimisation (BRIEF, FAST or REMs for locally switchable optimisation on a statement by statement basis) * Line numbers (ignore, display only or include) * Diagnostics on/off * Source format (freeform or structured - the latter for those who write structured BASIC programs, TURBO V2.0 providing them with the big bonuses of both faster compiling and greatly enhanced execution speed, never before available to compiler users: the former where TURBO is much more relaxed about the number of programming atrocities that it permits users to get away with!) * Local strings (ignore, report or create) * QRAM & Pointer environment (yes or no) * Number of windows to copy * Dataspace * Buffer size * Output filename * Medium * Report filename or destination * Listing on/off * Pause on/off * Sound on/off * Listing character width & height * Number of listing lines (dynamically adjustable with user-definable keys) * Listing colour * Compiler resident * Output task name (as opposed to filename) * Default settings for most of the above

TURBO V2.0 is absolutely the last word in refinement and ease of use. It is now totally compatible with the THOR and QRAM. The toolkit has been revised and expanded and now has 200 add-on commands, procedures & functions (most of which are listed on the right) to extend the power of SuperBASIC - all but half a dozen are available both under interpreter and TURBO! Now you realise why so many organisations have benefited from TURBO technology: QL WORLD * CST * EIDERSOFT * PDQL * PYRAMIDE * DANSOFT * QUANTA * ULTRASOFT * MD * MIRACLE * MISOFT * SHADOW * TRANSFORM * CURRY * ABC ELEKTRONIC * TESSERACT * HALLMARK * QUANTUM LEVELS * DS ENTERPRISES * SMILING SOFTWARE *

Below we present the PCW benchmarks for TURBO V2.0, with source format left on default (FREEFORM): toggling this to STRUCTURED makes it go even faster!

STANDARD PERSONAL COMPUTER WORLD SPEEDUP BENCHMARKS							INT	REAL
	1	2	3	4	5	6	7	MATH	MATH
TURBO vs SuperBASIC	34x	60x	40x	51x	40x	37x	41x	69x	22x

ALLOCATION	CURSOR_TS	G_SCALE	RELEASE_TASK	VIDEO_ON
ANIMATE	DATASPACE	HOW_COME	REMOVE_TASK	V_DIM%
BASIC_ATTR	DATA_AREA	IMPLICIT$	RETRY_HERE	V_DIM1%
BASIC_BS	DATA_TRACE	IMPLICIT%	RE_SAVE	V_DIM2
BASIC_F	DEALLOCATE	INK_COLOURS	ROTATE_L	V_DIM2%
BASIC_INDEX%	DEFAULT_DEVICE	INPUT_MONEY	ROTATE_N	V_DIM2%
BASIC_L	DEVICE_SPACE	INPUT$	SB_PROFILE	V_DIM3
BASIC_NAME$	DEVICE_STATUS	INTEGER%	SCREEN_ACTIVE%	V_DIM3%
BASIC_POINTER	DRIVE_RUNNINGS	LINE_RANGE	SC_PROFILE	V_DIM3%
BASIC_RUNNING	EDIT	LINK_LOAD	SEARCH_MEMORY	V_EXTEND
BASIC_SEARCH	EDIT$	LINK_LOAD_A	SETUP_MUSIC	V_OPEN_IN
BASIC_SIZE	EDIT%	LINK_LOAD_W	SET_CHANNEL	V_OPEN_TO
BASIC_TYPE$	END_CMD	LIST_EXTRA$	SET_FONT	V_READ
BASIC_VECTOR	END_WHEN	LIST_TM$	SET_KEYBOARD	V_READ1%
BASIC_W$	ERL_TM$	LIST_PROC$	SET_POSITION	V_READ2
BORDER_COLOURS	ERNUM$	LIST_TASK$	SET_PRIORITY	V_READ2$
BORDER_WIDTH$	EXECUTE	LIST_VAR$	SLAVE_BASE	V_READ2%
BUFFER_SIZE	EXECUTE_A	MEDIUM_COPY	SNOOZE	V_READ3
BUILT_WNDO	EXECUTE_W	MOVE_MEMORY	SPOOL	V_READ3$
BUMP_POSITION	EXTERNAL	MOVE_RAM	STRETCH	V_READ3%
BUM_NOTE	EXTRACT_INT$	NET_NUMBER$	STRING$	V_SET1
CAPS_LOCK	FAST_COPY	OPEN_EXTEND	STRIP_COLOUR$	V_SET1%
CATNAP	FILE_SIZE	OPTION_CMD$	SUPER_SPOOL	V_SET2
CHANNEL_COUNT$	FIND	PAPER_COLOUR$	SUSPEND_TASK	V_SET2$
CHANNEL_ID	FLIP1	PARSE_N_PLAY	TASK_BASE	V_SET2%
CHARGE	FLIP2	PEEK_F	TASK_COUNT$	V_SET3
CHAR_ATTR$	FLOAT$	PEEK$	TASK_PRIORITY$	V_SET3$
CLOCK	FONT1_ADR	PIPED_MUSIC	TASK_STATUS$	V_SET3%
CLOSE_WNDO	FONT2_ADR	PLAIN_ENGLISH	TASK_TYPE	WHEN_ERROR
COMMAND_FILE	FORCE_FONT	PLAY_TUNE	THROW_AWAY	WILD_PURGE
COMMAND_LINE	FORMAT_FP$	POKE$	TIDY_MEDIUM	WRITE_FILE
COMPILED	FREEZE_SCREEN	POSITION	TK_VER$	WRITE_OK
CONNECT	FREE_MEMORY	PRINT_MONEY	TO_UPPER	X_MINT
CON_CHANNEL	FUNCTION	PROCEDURE	TRACE	X_ORIGIN
CREATE_FONT	FUNCT_REMARK	PROG_SIZE	TURBO_TRACE	X_SIZE$
CURRENT_LINE$	GET#	RAM_SPEED	TYPE_IN	XEA_OR_NAY
CURSOR_OFF	GET$	READFILE	UNSHIFT	Y_MIN%
CURSOR_ON	GET%	READ_OK	VARIABLE_SIZE	Y_ORIGIN
CURSOR_TS	GLOBAL	REFERENCE	VIDEO_OFF	Y_SIZE%

UPGRADE FROM SUPERCHARGE TO THE TURBO SYSTEM JUST £65 FOR THE REST OF 1987! TO BENEFIT FROM THIS EXCELLENT OFFER, RETURN SUPERCHARGE MANUAL+LENSLOK+MC

SUPERCHARGE V1.19

The old favourite – this acclaimed system automatically translates slow SuperBASIC into fast multitasking machine code. Ideal for those who do not need the full power of TURBO. *"Superfast, Super compact and Super flexible – produces minor miracles – a superb utility – a 5 star program – a Sinclair User Classic (the highest award given to any program)"* **SINCLAIR USER**
"The best professional applications package available . . . extremely impressive . . . the quality speaks for itself" **POPULAR COMPUTING WEEKLY.**
"The claimed speed increase over SuperBASIC was substantiated . . . QLiberator lacks Supercharge's finer features and is generally slow" . . . **ZX COMPUTING.**
"A runaway success – SUPERCHARGE is dangerously close to being a completely over-the-top rave! . . . performance is simply dramatic . . . the final spark that sets the QL software scene alight . . . SUPERCHARGE really shows that you can do things on a QL that you can't on other machines" **YOUR SINCLAIR**
"The claims made by DP are completely factual and in some cases understated. I was astonished with the speed . . . incredible . . . it really does what it says. The QL is at last forced to live up to its original specification" **QUANTA**

£49.95 with 110 page A4 Manual.

SUPER MEDIA MANAGER V1.12

An essential program for anyone who uses microcartridges and/or disks to store things of value! No more need you fear for the safety of your programs & data. Super Media Manager provides a host of device management tools in one integrated, fully menu-driven unit – an unbelievable 350K of programs!

* Selective directory, copying, and erasing of files
* Sector loading and viewing (cursor controlled)
* Sector editing – Hex. and ASCII input allowed
* Automatic reports when mapping sectors
* Sector copying to sector, file, device, etc.
* Viewing, printing, or saving of drive map details
* Automatic (semi-auto on disks) recovery of deleted files
* Bulk recovery of corrupt files to new files
* Header block or Disk type information display
* String searching by sector or file – ultrafast
* Full directory sort facility, by name/size/type/date etc.
* Direct file copying from other disk formats (PC-DOS, MS-DOS, CP/M, Acorn DFS etc. etc.) – sector copying to other disk formats.
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* Disk sector editing for both QL & non-QL disks, with all the usual features
* Full error reporting with automatic recovery
* Hexadecimal calculator
* System configuration
* Control upto 256 separate cartridges/disks – DIRECTORY of DIRECTORIES

THOR COMPATIBLE

"SMM has every possible facility . . it's got to be a world beater" QL WORLD, November 1986

£39.95 COMPLETE WITH 98 A4 PAGE MANUAL OR £24.95 FOR A CARTRIDGE ONLY VERSION

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The full multitasking, stand-alone, high speed FORTH-83 system is now supplied with an extremely powerful compiled Othello (beat the 1983 World Champion program from MOI!). This latest version has new, extended documentation and full string handling. Now fully compatible with 68000 code & QDOS.

"Succeeds very well" **QL WORLD**
"The Definitive FORTH . . . excellent . . . very fast . . . user-friendly . . . the best" **QUANTA**

THOR COMPATIBLE

SUPERFORTH costs £39.95 complete with 100 page A4 manual

BETTER BASIC EXPERT SYSTEM

This does what its title implies, and its use is in analysing, correcting and annotating programs written in SuperBASIC or programs in other BASICs to be translated into SuperBASIC. BETTER BASIC is user-configurable and very easy to use.

"Excellent – a 5 star program" SINCLAIR USER, December 1986
"Intelligent – does well what it sets out to do" QL World, Jan. 1987

THOR COMPATIBLE

BETTER BASIC costs £24.95 complete with manual

£5 OFF if you are also ordering TURBO or SUPERCHARGE

★★★★★ GAMES ★★★★★

There is a misconception among those who don't own a DP game that because DP produces the best "serious" software, DP can't also be good at games. We strongly disagree!!

BLOCKLANDS £9.95 DP Classic
"An addictive game . . . at twice the usual speed" QL WORLD

DROIDZONE £9.95
"mind-numbing" SINCLAIR USER
"For sheer blasting you would be hard pushed to beat DROIDZONE" QL WORLD

SUPER ARCADIA £9.95
"We flipped over SUPER ARCADIA" HOME COMPUTING WEEKLY

SUPER REVERSI £9.95
Did you think Psion Chess was strong?

SUPER BACKGAMMON £12.95
"Brilliant" QL WORLD

Any 3 for £24, any 4 for £30, all 5 for £36!!

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Superb games designer in its final form. New manual, upto 256 multicoloured sprites, upto 256 planes, upto 16 frames each, windows with screen 1 and 2, 100% flicker free, individually variable speeds, hundreds of special effects. Works with keywords from SuperBASIC or machine code (new faster integer keywords supplied) – easily compiled with SUPERCHARGE or **TURBO.**
"A well-designed & carefully planned utility – invaluable – simply excellent" **QL USER.**
"The sprites produced are very good" **POPULAR COMPUTING WEEKLY**
"Excellent" **THE U.S. QL REPORT**
"The results that can be achieved are excellent" **ELECTRONICS & COMPUTING**
Most QL games on the market are written using Super Sprite Generator

THOR COMPATIBLE

£29.95 COMPLETE, OR £24.95 IF BOUGHT WITH EYE-Q

PROFESSIONAL ASTROLOGER V1.5

DP Classic

THOR COMPATIBLE

NEW FASTER VERSION (TURBOCHARGED)

★ Amazing Astrology system ★Supplied with 140 A4 page Manual which assumes no knowledge of astrology ★ Gives 10 A4 pages of personality/character delineation ★ Gives 6 A4 pages of day-to-day and year-to-year personalised text predictions ★ Gives 3 A4 pages of text comparisons between two people ★ Massive 300K of user adjustable text files (450K for disk users) supplied together with machine code editor ★ Incredibly fast – 0.5 seconds/computation ★ One minute accuracy this century ★ Exact hardcopy on all options – 16 print modes, user definable astrological glyphs and printer driver ★

Transits ★ Progressions ★ Synastry ★ Choice of 7 house systems ★ Individually adjustable orbs ★ Batch processing mode ★ Full Quill compatability ★ 158 birth data files supplied ★ File compression ★ Output to any device, including files ★ Advanced command language using AND/OR/NOT and a PO123456789 multiple criteria facility ★ Eclipses ★ Closing aspect indicator ★ Comprehensive user tunable defaults ★ Rectification ★ Extremely user friendly ★ Real-time interpretation trim ★

"One-of-a-kind . . . every requirement provided for . . . descriptions such as superb, ultimate, excellent are barely adequate" QL World
"The most powerful & complete astrology package on any micro . . . provides everything that a present day Nostradamus will need . . . the ultimate astrology package . . . a 5-star (☆☆☆☆☆) program – a Sinclair User Classic (the highest award given to any program)" SINCLAIR USER.
"The best Astrology program of them all" PREDICTION, Europe's leading astrological magazine.
"Fascinating . . . unrivalled accuracy . . . excellent value . . . the most comprehensive astrology program ever produced" LIVERPOOL ECHO.
PROFESSIONAL ASTRONOMER is £10 extra for users of Professional Astrologer. ASTRONOMER has a full planetarium display, a choice of 8 coordinate systems. Moon/Mercury/Venus/Mars actual face display with real shadows and eclipses, automatic parallax correction (only NASA has this!), solar system display in parallel projection with zoom, tilt, freeze, autoincrement, etc. If not bought at the same time as Astrologer, the price is £29.95

£59.95 Complete with huge manual, or £69.95 with Astronomer

SUPER ASTROLOGER £24.95

"Incredibly fast . . . unnervingly accurate even on default files . . . a powerful tool . . . easily the best & most powerful astrology program for any micro . . . I would strongly recommend it" **QUANTA**
"An invaluable tool – an excellent package – a 5 star (☆☆☆☆☆) program" **SINCLAIR USER**

A fun-filled package for beginners – ideal for parties, friends, entertainment.
"Succeeds very well . . . an excellent program . . . you certainly will not find as good an astrology program as this on any other home computer" **QL USER/QL WORLD**

EXTRACTS FROM QUANTA (INDEPENDENT QL USER GROUP MAGAZINE) TURBO: Second to none . . . excellent . . . nothing can match the QL supported by TURBO. TOOLKIT: An excellent investment to anyone interested in programming. EDITOR: Its uses seem endless . . . outperforms all others . . . DP's best program as yet . . . a joy to use. EYE-Q: Superb . . . the best graphic program available. BETTER BASIC: A must.

EYE-Q V2.1 The Definitive QL Graphics/CAD System

Fully driven by pop-up menus ★ single key entry ★ several zooms ★ windowing ★ proportional movement ★ paint/fill ★ rubber bands ★ arcs ★ ellipses ★ circles ★ lines ★ files ★ replicable sprites ★ horizontal & vertical stretch ★ reflect ★ invert ★ transfer ★ pan/scroll ★ undo (ie; whoops!) ★ font design editor ★ automatic anti-aliasing ★ graphic screen compression ★ offset display ★ on-screen help ★ XOR/OR cursor with variable width ★ paste ★ recolour ★ magnify ★ reduce ★ text inclusion ★ freehand movement ★ localised save/load/scroll/pan/recolour/zoom ★ integral font editor ★ full range of QDOS colours & stipples available through paintbox ★ user-definable defaults ★ 2 fonts supplied amazing 4 colour airbrush ★ user definable printer driver (user sets proportionality, graphic mode, density etc) – hundreds of printers supported ★ improved fill and compress ★ 3 text modes plus toggle off ★ rubber band boxes and own screens ★ full compatibility with SUPERCHARGE, **TURBO**, SSG V4.0, joysticks + **TURBO** TOOLKIT ★ monochrome save ★ localised options on all full-screen operations ★ user switchable resolution ★ SuperBASIC extensions supplied free ★

Two artistic but provocative demo screens supplied – prudes stay clear!!
"Includes every conceivable drawing option . . . is simple to use . . . a powerful CAD system of monumental proportions . . . outstanding . . . a brilliant concept, highly innovative . . . accuracy is superb . . very well produced, incorporating the best features of other graphic programs . . . very original, useful, highly-innovative functions . . ." QL WORLD

"Digital Precision is right, this is the definitive QL art package – go out and get it. This program wins. no problem!" SINCLAIR USER
"Up to now, the last word in graphics packages for the QL has been from Talent. EYE-Q has more features, is considerably easier to use, and is also about half the price!" POPULAR COMPUTING WEEKLY

DP Classic

EYE-Q costs £29.95 complete with lucid A4 documentation
EYE-Q is fully compatible with DP's new DESKTOP PUBLISHER
The GIGA mouse version of EYE-Q costs £34.95

THOR COMPATIBLE

A mouse that will work with the ordinary version of EYE-Q is available from us. It is the SMILING MOUSE, and costs £49.95, or £60 with EYE-Q!

DESKTOP PUBLISHER

DESKTOP PUBLISHER is a full-function machine code desktop publishing system for the QL with 256K expansion RAM. It is designed ambitiously: our target was to equal anything else available for a home micro. Most reviewers (including those of POPULAR COMPUTING WEEKLY, QL WORLD & QUANTA) think we've done it!
Here are the features of DESKTOP PUBLISHER:
* total user control * WYSIWYG * 12 integral graphic fonts * 8 integral text fonts * 150 integral graphic symbols * 160 integral paint brush shapes * 10 non-integral fonts * decorative fonts * all fonts stretchable & squeezable in both X & Y directions * auto borders and margins * defined proportions redefinable at pixel level * true descender editing (separate descender files!) * merging with AND/OR/XOR * colour reversal * mirroring * switchable grids & rulers * upto 15x zoom * stipples * stripes * rotation * importing of text and non-text documents/files from EDITOR, QUILL etc * importing of screens, part screens & compressed screens from EYE-Q & other graphic packages * freehand drawing with unrestricted mixing & overlapping of text & graphics * cut & paste * selective save * hierarchical escape * 960x800 pixel drawing area: 2 pages in RAM if you have 512K expansion, with cut & paste between pages possible * 80 lines x 160 columns * device independence * Epson compatible output * upright or sideways printing * 8x8 & 16x16 UDGs * integral font editor * integral graphics generator * pixel based left, right & centre justification * pixel or character based movement * cursor dragged, user-defined boxes * pop-up menus * 4 cursors * 4 underline styles * bold, left italics & right italics * multiple justification possible * variable linefeeds * panning & scrolling of screen, window & contents, all separately controllable * cameo for overview * direct entry of text with many editing commands * full compatibility with EDITOR * clip art * CAPS LOCK indicator * context sensitive help * status box on screen * reconfigurable printer driver * multiple pass printing * lucid A4 manual * ideal for creation of A5/A4 booklets, newsletters,cards, letterheads, posters, bulletins - even small magazines
DESKTOP PUBLISHER costs £59.95 complete.

SPECIAL EDITION DESKTOP PUBLISHER
If you have at least 512K of RAM and a disk drive, you can have something even better than DESKTOP PUBLISHER - DESKTOP PUBLISHER SPECIAL EDITION! This incredible program has ALL the features of DESKTOP PUBLISHER, and in addition has:

THOR COMPATIBLE

1. Windows larger than visible screen, upto page size
2. Auto-sizing of incoming text to find optimum character size - this has full manual override
3. Auto-hyphenation on incoming text
4. Line/arc/ellipse draw routines
5. Intelligent texture fill routine - over 7000 textures can be selected, and these can be inversed, reflected or inverted
6. Now 21 integral QL character sets
7. Any/all of the 21 sets can be used in one piece of text
8. Easy changing of characters within loaded text
9. User selectable word-wrap and justification (left/right/middle, either to character or pixel)
10. You can specify percentage of line to be filled and the largest permissible gap, in pixels, between words - this gives you full control over the way words are spread over lines
11. Underlining/inversing of individual words
12. Load both text and 16x16 fonts across any area upto the whole page in one go
13. Inversing, mirror-imaging and inverting of page
14. Full Quill _LIS and _DOC file compatibility, even paying attention to hidden control codes so bold appears bold, italics appear as italics, underline as underline etc. Indeed, you can set up translate tables so SPECIAL EDITION DESKTOP can support any convention for control codes (EDITOR users please note!)
15. Justification of 16x16 fonts - all 16x16 operations are now much faster
16. Define your own textures - no restrictions
17. Full multitasking
18. Improved printer driver, with facility for 1-5 passes in either single, double or quad density
19. Undo facility available in most modes
20. Redefinition of foreign character sets possible
21. Saving of screens, not just pages - EYE-Q owners please note!
22. Different page sizes for A3, A4 and A5 pages
23. Ability to load pages designed by FRONT PAGE
24. Wildcard directory with auto pause
25. All commands selectable both via single keypress or menu bar
26. Larger page sizes for MXBQ type printers
27. Full THOR compatibility
28. Improved user-friendliness

The SPECIAL EDITION DESKTOP PUBLISHER is the supreme desktop publishing system. It costs £79.95 and is far superior to anything else sub-£1000. If you already have the ordinary version, we can upgrade you to the SPECIAL EDITION for £30 only - return the manual and cartridges/disk.
For the very ultimate we recommend the following combinations:
* SPECIAL DESKTOP + EYE-Q £104.95
* SPECIAL DESKTOP + SPECIAL EDITOR £114.95
* SPECIAL DESKTOP + SPECIAL EDITOR + EYE-Q £139.95

IMMINENT

SUPREME CP/M EMULATOR
Easy to use machine code system which allows you to run CP/M software on your QL, giving you access to a vast range of commercial and public domain software and MSDOS. Speed is crucial and our Emulator is very fast.

3D CAD SYSTEM
An amazingly smooth & flexible 3 Dimensional graphic designing/editing system with image manipulating toolkit

ULTRAPRINT - A NEW DIGITAL PRECISION PROGRAM
If you want superb graphic printouts ("dumps") from any EPSON- or OKI- compatible printer, this is the program for you. ULTRAPRINT provides you with an excellent choice of 22 different sizes/styles, giving you control over both output dimensions and the way in which on-screen colours are translated into shades on paper. You can have upto 5 passes to improve clarity and contrast. The program is very easy to use, fully multitasking, ultrafast and (of course) fully compatible with EYE-Q (including condensed screens and part screens) and all other graphics programs. For those interested in PCB design, there is yet another facet to ULTRAPRINT - it has special PCB dump modes that will produce perfect originals for PCB production, from PCB screens designed on EYE-Q.
ULTRAPRINT is supplied with a lucid A4 manual, especially designed for those who find printers confusing.
ULTRAPRINT costs just £19.95.

THOR COMPATIBLE

THOR
COMPATIBLE

THE EDITOR V2.05 / V1.17

THE EDITOR is a word-, text-, character- and file-processing system characterised by massive power (see command list), very high speed (see speed benchmarks) and extreme flexibility and ease-of-use. EDITOR can handle text files, Quill files, programs in BASIC and other source languages, data files (it handles the entire character set 0-255), screens, machine code object files (even EDITOR itself) the lot. You have complete control over fonts and over all the system defaults we could think of via a comprehensive configurator (to give you an idea of just how comprehensive, not only can you set up defaults for 3 ink & 3 paper colours, screen mode, average line length, screen shape/size/position, character width/height, insert/overstrike, data/program default devices and names and dozens more mundane features, but you also have access to the settings for the EDITOR's definition of a word (ie; what constitutes a word delimiter), the column position at which scrolling to a fresh screen will occur, and so on). Needless to say, EDITOR is fully multitasking, and it is not uncommon for the more adventurous user to have 2,3,4,5,6 or more copies all running simultaneously, using varying screen positions (overlapping or distinct), shapes, colours or character sizes to distinguish them. You can 'teach' Editor what you want it to do by means of command files (like macros, but much more flexible). Throughout, EDITOR's hallmark is absolute consistency of operation (which makes it very friendly, despite the daunting number of commands!) and its philosophy of placing YOU in the driving seat, leaving it up to YOU to decide how, where and in what sequence you should accomplish your objectives, and unlike Quill one of whose major failings was its pedantic way of imposing its preferred sequence on you.

There are two versions of EDITOR: V1.17 that will work on any QL (comes with a 90 page manual) and a SPECIAL EDITION EDITOR V2.05 with 40% more commands, much greater power, and an brand new (November 1987) extended manual (now 160 pages!) but which requires at least a 128K RAM expansion in order to run. Owners of the ordinary EDITOR who acquire a RAM expansion and wish to upgrade to the SPECIAL EDITION may do so for £25, including an exchange of manuals. The spelling checker SPELLBOUND has a 30000+ word dictionary, works with EDITOR and QUILL, and is available for £29.95.
If you want to buy a 512K expansion with plug-through connector, we'll supply one for £74.95.

'D'P Classic

EDITOR costs £29.95
SPECIAL EDITION EDITOR costs £49.95

"Superb .... it exceeds feature specifications found in even the best word processors presently available .... natively multitasking .... you will actually look forward to using Editor (this never happened with Quill!) ... you are in complete control .... seldom have I ever come across a program which positively scintillates with such dare care and attention" .... QL World, January 1987.

Cursor Controls:

	Move		Delete	
Character	←	→	CTRL/←	CTRL/→
Word	SHIFT/←	SHIFT/→	CTRL/SHIFT/←	CTRL/SHIFT/→
End line	ALT/←	ALT/→	CTRL/ALT/←	CTRL/ALT/→
Line	↑	↓	CTRL/SHIFT/ALT/←	
Line	CTRL/↓	ENTER	CTRL/←(col 1)	
Screen	SHIFT/↑	SHIFT/↓		
Scroll	ALT/↑	ALT/↓		
Screen page	SHIFT/ALT/↑	SHIFT/ALT/↓	Temp Margin	
Start para	CTRL/ALT/↑	CTRL/ALT/↓	Left margin:	ALT/TAB

F5 Text Characters may be entered in either Overstrike or Insert mode
SHIFT/F5 Force garbage collection
F4 Screen may be redrawn
SHIFT/F4 Screen may be resized
F1 Command group may be specified and executed
SHIFT/F3 Last Command group may be edited and executed
F2 Command group may be re-executed
SHIFT/F2 Last Find or Exchange command may be edited and executed
CTRL/F2 Last Find or Exchange command may be re-executed
ESC Commands may be interrupted/halted
CTRL/C Multitask - no need for any external multitasker

Command format:
Commands may be entered singly or in groups, space or semicolon separated
A number may prefix any command or group - it is treated as a repeat count
A group is specified by enclosing the commands in brackets
Sequential files of commands (called command files) can be created and executed, as can individual lines
Command files can be called with up to 9 parameters with automatic substitution and programmable prompts
Command files may contain commentary lines (starting with fullstops)

File commands:
P Read text from device
RD Read document file
RU Read unformatted file
RC Read commands file
W Write text to device
WP Write text to printer
WR Write text to device
BW Write block to device
AF Append from device

Small Movement commands:
N Next line
P Prior line
CR One char right
CL One char left
CS Start of line
CE End of line
CB Start of Block
CK End of Block
CW Word right
CM Marker point
CP Start of parag

Big Movement commands:
T Top of file
B Bottom of file
L Last command point
GB Bottom of file
GC Go to char
GL Go to line
GP Go to page
GPR Go to prior page
GPS Go to soft page
GT Top of file
NL Next longer
NS Next shorter

Find/Exchange commands:
F Find string
E Exchange strings
Qualifiers....
B Search backwards
W Match string is word
Q Query before exchange
C Text Case significant
+ AND
- OR
< Begin
> End

Block commands:
BT Type
C - Character
K - Column
L - Line
BH Hide / Show
BS Mark start
BE Mark end
BI Insert after
BD Delete Block
BM Move Block
BW Write Block

Quit commands:
Q Quit without save
X Quit with save

Insert commands:
I Line before current
A Line after current
AF File after current
BI Block after current
S Split current line

Delete commands:
D Current line
DC Current character
DW Current word
BD Block
J Join line with next

Marker command:
SM Set Marker

Tabs commands:
ST Set TAB increment value
TA Set asymmetric TABs
TD Delete a TAB point
TI Insert a TAB point
TR Remove all TAB points
TE Expand TABs
TC Compress TABs

Margins commands:
SI Set para start indent posn
SL Set left margin posn
SR Set right margin posn
MR Release the right margin

Justification commands:
JR Set right justify mode
JL Set left justify mode
JC Centre justify current line
JM Middle justify current line

Undo commands:
U Undo changes to current line
UD Undo last deleted line

Renumber and Sort commands:
RN Renumber block lines
SQ Sequence block lines
SQN Sequence block lines

Case Adjustment commands:
ML Cursor word to lower case
MM Cursor word to mixed case
MU Cursor word to upper case

Reformat commands:
PR Paragraph reformat

Memory commands:
TL Specify Avg Line Length
M Specify memory size
Z Zap the memory file

Sundry commands:
BZ Sound Buzzer
CD Cursor delay
EX Execute line under cursor
RP Endless repeat of commands
SH Show system status

Document commands:
MD Make Document from text
PL Specify Page length
PH Paging hide/show

Plus all the commands of SuperBASIC!

SPEED TESTS

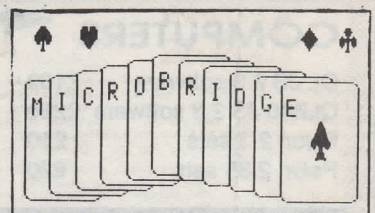
'-' means 'feature not supported'

TIMINGS IN SECONDS	STANDARD EDITOR Time	Ratio	Metacomco ed Time	Ratio	QUILL v2.35 Time	Ratio
Load file (text) $1	47.7	100%	59.2	81%	997.4	4%
(Quill) $2	17.5	100%	-	-	27.2	64%
(other) $1	16.4	100%	-	-	-	-
Save file	46.1	100%	151.9	30%	91.5	50%
Merge file	47.8	100%	360.0	13%	205.6	23%
Create 100 lines of 64 cols	7.1	100%	264.0	2%	264.1	2%
Define 100 line block	1.5	100%	22.5	6%	140.5	1%
Move block fwd by 200 lines	3.9	100%	313.1	1%	227.4	1%
Copy block at bottom to top	4.9	100%	67.3	7%	c3 days!	0%
Delete 100 lines	2.8	100%	205.6	1%	120.3	2%
Page from top to bottom	12.1	100%	333.8	3%	902.8	1%
Find string - case dependant	12.3	100%	17.3	71%	-	-
Find string	32.1	100%	45.7	70%	48.9	65%
Find 10th occurrence	19.0	100%	36.2	52%	35.9	52%
Find 12th occurrence	0.3	100%	6.0	5%	41.1	1%
Find string A or string B	34.5	100%	-	-	-	-
Find string A and string B	32.7	100%	-	-	-	-
Find backwards	32.3	100%	42.6	75%	-	-
Find string as a word	32.3	100%	-	-	-	-

NEW PRINTER DRIVER AVAILABLE FROM 20TH NOVEMBER 1987
SUPPLIED FREE WITH BOTH EDITOR AND SPECIAL EDITOR

- Prints documents to ANY printer
- Can use ANY text feature of the printer
- Can support ANY NUMBER of "translates"
- Can support ANY translate convention
- Multiple line Headers and Footers
- Multiple occurrence of Headers and Footers in one document
- Wholly flexible pagenumbering
- Supports Bold and Underline on ALL printers
- Single sheet or Continuous stationery
- Print whole file or specified page range
- Pause printing prior to Head of page
- Abort printing at any time
- Compatible with all text files and Editor document files
- Spooling
  - F1 Specify Default Device
  - F2 Specify Printer Device
  - F3 Select Printer Type
  - F4 Commence Printing
  - F5 Quit

Name Introduces a new printer description set
PDV Device. To which device is the printer connected
PBD Baud rate. The speed at which the printer is set to receive characters from the computer
PRS Reset sequence. A control sequence which causes the printer to reset to its internal defaults
PCN Cancel sequence. Causes all data in the buffer to be lost
PPA Preamble sequence to be sent to the printer at the beginning of the document/fragment
PPO Postamble sequence to be sent to the printer at the end of the document/fragment
PHM Header margin (number of lines) to be reserved at the top of page. Any "page header" specified will occur within these lines
PFM Footer margin (number of lines) to be reserved at the bottom of each page. Any "page footer" specified will occur within these lines
PPL Useable page length (number of lines). The amount of space within which document text will be printed
PPG Page numbering required
PPC Column number for default page number
PPN Reset page number (new page number). May occur anywhere within a document, though typically at the start
PLM Left margin (column number)
PEL End of Line code. Specifies the control sequence to be sent at each end of line
PSS Single Sheet printing required - pause at each page end
PPS Pause code specifier
PPB Conditional Page Break (number of lines). If the number of useable lines remaining on the current page is less than the specified number, a page break will occur
PHD Page header text
PFT Page footer text
PBO Boldface is not supported by the printer. The program should 'synthesize' boldface
PUL Simultaneous underline is not supported by the printer. The program should 'synthesize' simultaneous underline
PXG Exchange with Global effect
PXL Exchange with Line effect
PTG Toggle with Global effect
PTL Toggle with Line effect



MICROBRIDGE A NEW DIGITAL PRECISION PROGRAM!
MICROBRIDGE is a superb Contract Bridge player and bidding tutor - you can use it either for entertainment or expert tuition, or for both together! Only a very elementary knowledge of the rules of Bridge is assumed (we can recommend you a good book if you do not know anything at all about the game) - the large and lucid A4 manual (equipped with comprehensive glossary) does the rest. The program is also aimed at strong Bridge players who want to refine their skills.
To use the system for entertainment only is simplicity itself. The computer automatically deals (dealer hand can rotate or be fixed) and assumes the role of both your partner as well as the opposition (if you have a human partner and a second QL, the two of you can play against the computer too). You will find that you and your partner will have the better cards between you, and it is up to the two of you to find a contract - you do your bit, the computer does its. The computer will comment on your bidding if you wish it to, clearly explaining why it agrees or disagrees with your bid, and what it thinks the best bid is (and why). Prepare to be astounded at the way in which the computer mimics the diagnostic thought processes of a very strong player in making its commentary. If you wish, the computer will explain the bids it makes for your partner too. Once bidding is over, you can either replay or review/change the bidding sequence if you wish - the computer will rethink responses and commentary from the changed bid onwards. This done, you will normally opt to play the hand - if partner was declarer you assume his position, its no fun being dummy! The computer will, of course, play the opposition, and will do its best to defeat the contract, through fair means: as usual, you can review/replay as well as scan the whole deal. 'Fair means' needs amplification - virtually every Bridge program on the market besides MICROBRIDGE cheats. The two methods of cheating are (1) The computer knows the contents of all the hands and uses this information when bidding and playing - this results in extremely weird bids and card play: for example, the computer never losing a finesse! (2) The computer actually switches cards between the hidden hands during play, so you never win a finesse. In this way other Bridge programs disguise their poor bidding and absurd play. Needless to say, MICROBRIDGE never cheats in any way (it doesn't need to!) - both during bidding and play, no information is used by the computer except the cards in the hand whose bid/play is being considered, the bidding/play so far, and (in the case of play) the visible dummy hand. This results in enjoyable and human-like bidding and play. In tutor mode, you can either choose between about 700 carefully selected deals, arranged in 16 thematic lessons, or generate a pseudo-random deal yourself. MICROBRIDGE is an ACOL player (Blackwood and Stayman and prepared bids too) of strong club player standard, and will ask you your bid on your hand, and tell you whether or not it agrees, and why (the 'why' occupying upto 10 sentences of detailed reasoning in English - this is stunning). If it disagrees, you have the option of insisting on your bid or accepting MICROBRIDGE's advice. In both cases, MICROBRIDGE resumes bidding the hidden hand (yes, you can opt to see it - and yes, you can be tutored/tested on that hand too). When the final contract is reached you have the option of playing as declarer, as before. There are many other features too, including the ability to generate ultra-strong hands for practice at bidding and playing slam or near-slam contracts, and to return to a deal at any time via a code. MICROBRIDGE is unique, and great fun, and very educational too. You will need at least 256K RAM expansion to run it, as well as a disk drive.

MICROBRIDGE costs just £34.95 - incredible value!

"Incorporates new ideas of real value"
THE TIMES HIGHER EDUCATION SUPPLEMENT

The Power Behind The Button

** If you have not received a copy of our 52 page product brochure as yet, please write to us asking for one and we will ship it to you free. It contains details of an exciting prize draw too!*

** Digital Precision always pays attention to feedback and suggestions from our customers: many of the program updgrades detailed in this ad have resulted from these! For example, the very latest SPECIAL EDITOR (v2.05) has an instantly updated word count and a full-featured 'Document' mode (with visible fixed and auto paging etc) for those who wanted it to more closely resemble a conventional word processor - we did this without reducing its speed or flexibility as a development tool. In response to Brian Torode's request in QUANTA, all EDITORs are now supplied with an even better printer driver, which allows (among many other things) page numbers anywhere, with any message, in any style, as well as variable headers/footers thro' a document! With TURBO v2.0 you get full QRAM/TOOLKIT/THOR compatibility, and for those wish to use it on not so well-written source code, a more tolerant 'FREESTYLE' mode (Rosenthal & Borman in QUANTA). Ta!*

- UK delivery costs are all-inclusive. Europe add 5%, elsewhere 10% to cover airmail costs.
- Program upgrades can be obtained by sending us the original cartridge (NOT the packaging or documentation) plus £10 (£12 Europe, £15 elsewhere).
- TRUMPCARD DISK INTERFACE.....£189.95
  or swop for your 512K SuperQBOARD...£99.95
  Phone for quotes on swops for other i/fs.

DIGITAL PRECISION

DIGITAL'S LINE:
You too can find love - with DP's super programs

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for the amount of £..... Number ..... Expiry date .....
Please indicate if you have ☐ 3½" disks ☐ 5¼" disks ☐ Microdrives only
If you have disks, do you get ☐ 720 sectors ☐ 1440 Sectors Signature .....

The Best QL software from DIGITAL PRECISION

COMPUTERS

QL JS 2.3 software	£169
QL640 JS 2.3 software	£260
Psion 2.3 sets	£10
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PSION ORGANISER

Organiser XP 32K	£138
128K Rampack	£100
32K D Rampack	£55
Harvester Superchip	£99
Data Organiser	£35

Z 88

Z88 + mains adaptor	£297.50
32K Rampack	£20.00
128K Rampack	£50.00
QL - Z88 link	£23.00
Centronics interface	£30.00

TK COMPUTERWARE

the QL stockist

Tel: 0303-81-2801

DISC SYSTEMS

Dual 3.5 in. + Trump Card	£350.00
Single D/D 3.5in. drive	£125.00
Single D/D 3.5 in. & 0K SQB	£225.00
Dual D/D 3.5 in drive	£209.00
Dual D/D 3.5 in. & i/face	£295.00
Dual 3.5 in. & 512K SQB	£350.00
Cumana disc interface	£ 86.25
768K Trump Card	£199.00

SPARES

JS ROM sets	£27.50
Keyboard membrane	£6.25
Keyboard bubble mat	£3.85
ULA ZX 8301	£9.50
ULA ZX 8302	£10.25
MAB 8049	£7.50
CPU 68008	£25.80
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Voltage regulator (high output)	£4.75
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10 Microdrive cartridges	£17.50
Cartridge storage box	£5.50
QL Dustcover	£5.00
100 Microdrive labels	£3.75
Powerclean filter	£36.00
Eprom Programmer	£129.00
Battery clock kits	£19.50
10 DS/DD discs 3.5" (u/b)	£18.50
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512K internal U/G	£94.00
Centronics Interface	£19.50

SOFTWARE

BUSINESS

Flashback (c-d)	£25.00
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Decision Maker	£35.00
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Project Planner	£29.00
Small Traders Pack	£25.00
Spellbound (c-d)	£30.00
Spellbound + Filebound	£35.00
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Pacioli	£25.00

UTILITIES

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Assembly Lang. Toolkit	£25.00
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Desktop Publisher - S/Edition (d)	£80.00
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Front Page Extra 2 (c-d)	£40.00
ArchRTM	£20.00
ICE Eprom	£27.00
ICE Drawing Office	£15.00
Key Define	£10.00
Locksmith	£11.50
Mailfile (256K)	£20.00
PCB Designer 1	£99.00
QFLASH Ramdisk + toolkit	£19.00
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BOOKS

Using the Psion Organiser	£10	QDOS Companion	£7
Assembly lang. Programming	£9	Technical Guide	£20
QL Advanced Programming	£15	QL Service manual	£20

Other QL titles available - phone for details

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Bigger and better

With the multitude of toolkit programs from which to choose, it is scarcely surprising that QL owners are in a quandary. Further, it is always the case that whichever toolkit is chosen it is certain to lack that vital command just when you need it.

Compware hopes to solve the problem with the release of *Mega-Toolbox*, containing more than 160 new commands. aimed specifically at SuperBasic programmers, Mega-Toolbox commands are claimed to be largely original, complementing presently-available toolkits. The toolbox is compatible with QL SuperBasic compilers and customised versions will be available for use by software houses in their programs.

Mega-Toolbox commands include improved command line editing, job control/memory allocation commands, tune-playing jobs, alarm clocks, copying/mirroring-/zooming/saving/restoring windows, a multi-tasking print command for rolling demonstrations/slide shows, 3D text printing, screen swapping, pipes, keyboard control, memory copying and fill.

The price is £29.95 including P&P. For further information contact Compware, 57 Repton Drive, Haslington, Crewe CW1 1SA.

Qtalk

A speech synthesiser has recently been launched for the QL. *Qtalk* has 16 levels of programmable pitch and more than 400 rules to convert text to speech. It includes an exception dictionary of the most common 25,000 words and the user may define his own exception table which may be saved to disc or Microdrive.

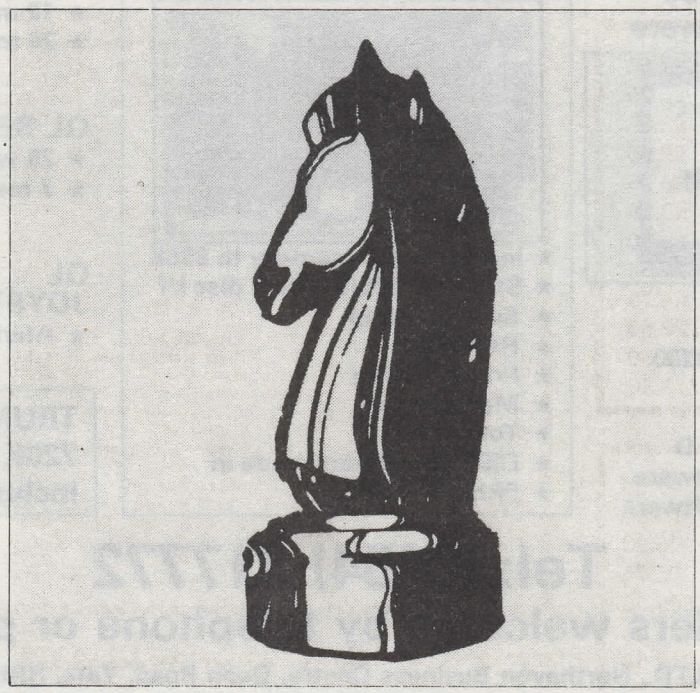
Qtalk is configured as a standard output device, allowing files can be listed and copied to it and making it very easy to use. In addition to its obvious uses in talking programs, it can also handle Quill and Editor files.

The software requires approximately 20K of RAM, so it will work satisfactorily on a standard machine, though anybody using Qtalk and Quill simultaneously could experience memory problems.

Two games have been released using Qtalk, though they also operate without speech. *Alien Hijack* is a 3D arcade adventure, along the lines of the Ultimate Knight Lore-type games for the Sinclair Spectrum. The second game, *Puzzle Mania*, is a 40-screen levels-and-ladders arcade game. Qtalk costs £88.50 including P&P. Alien Hijack is £18.25 and Puzzle mania £12.50.

Qtalk is available from Chi-Soft, 20 Chandros Way, Welgarth Road, Hampstead, London NW11 7HF. The system is produced by Maxtronics R&D Ltd, 26a Conway Street, Christchurch 2, New Zealand.

Chess champion



Psion Chess has been in battle again, adding two new world titles, World Microcomputer Software for Chess and World Personal Computer Chess Champion.

The first tournament was staged in Rome by the International Computer Chess Association, with each of the seven programs playing each other. To gain the title, Psion Chess dropped only half a point in the six games, beating much more powerful machines to emerge as winner.

Personalising service

The Appointments/Sales Chasing/Follow-up Diary is now available with a special service from PDQL. If returned within 28 days from despatch, PDQL will personalise the program to suit the customer's stated requirements.

The program needs extended memory and is an Archive/DEV application. It is designed to fix appointments, itemise pre-appointment duties, to help chase existing clients/customers and to set out future duties.

The package costs £48. For further information contact PDQL, Unit 1, Heaton House, Camden Street, Birmingham B1 3BZ.

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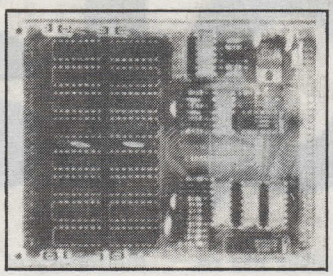

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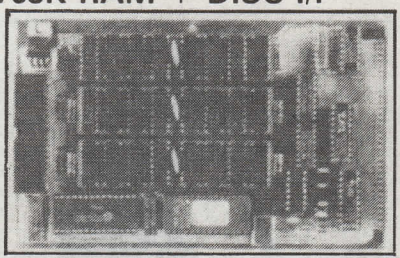

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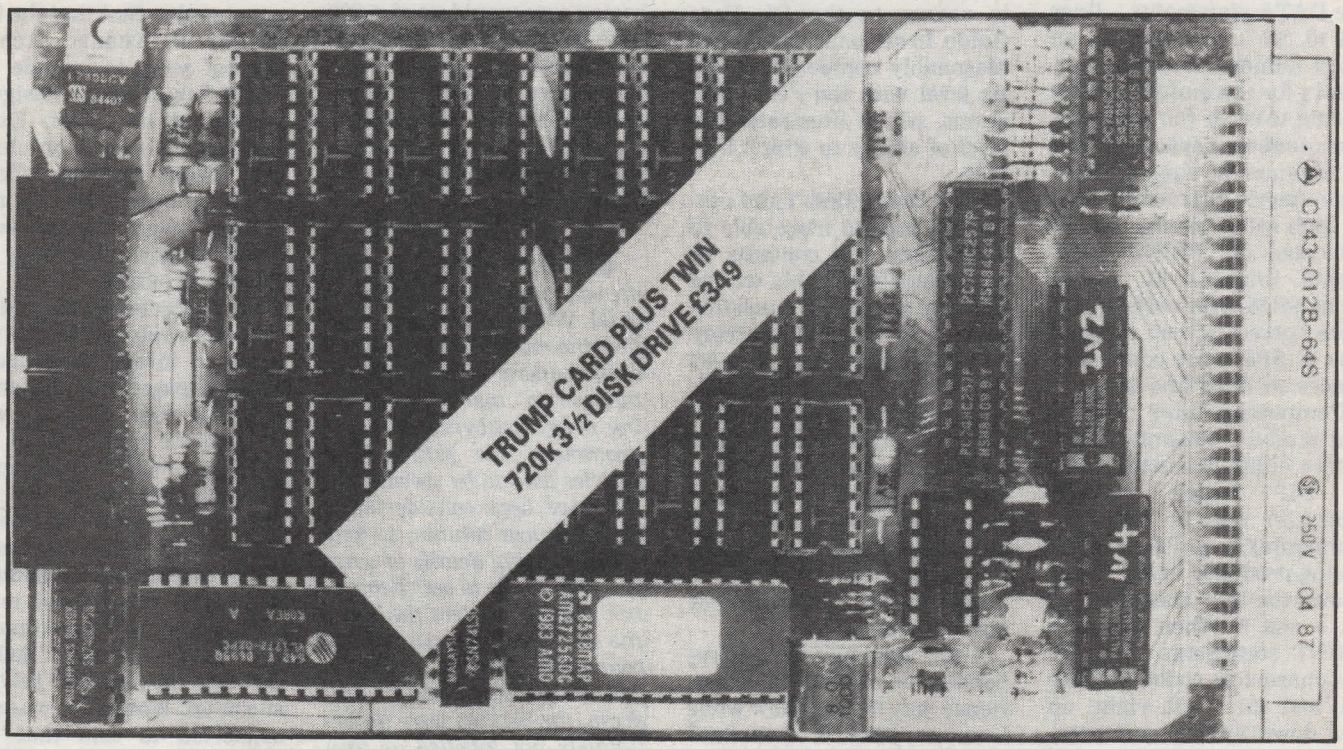

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OPEN

Open Channel is where you have the opportunity to voice your opinions in *Sinclair QL World*. Whether you want to ask for help with a technical problem, provide somebody with the answer, or just sound off about something which bothers you, write to: Open Channel, Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG.

Gigo

I would like to warn anybody who tries to type in the *QL Convertor/Calculator* program October, 1987. It can be difficult to determine from listings the validity of certain characters and the exact number of spaces in some statements, which can make all the difference to whether or not a program runs.

In this instance, some of the DATA statements – lines 152 to 162 – must contain an exact number of spaces, necessary for the multiple string slicing used in the program. The number of spaces needed is 12 minus the sum of the alphanumeric characters within each set of quotes. Spaces indicated in PRINT statements – lines 12 to 31 – should be handled with care to produce correct screen data. In line 6, SP$ must contain 15 spaces, as must line 50.

Computer/printer listings can produce unwanted characters, either due to the printer DIP switch settings, character sets or other incompatibility problems. The listing produced in *QL World* shows the four characters «, =, » and ?. When found in PRINT statements they are the characters coded 188, 189, 190 and 191 – left, right, up and down arrows on-screen. To get them you will have to use the CTRL key. See the character set codes in the QL manual for more information.

E Bamber, Glasgow.

What could they mean?

Having taken *QL World* for more than two years, I am at last moved to make a plea for those who are relative novices to the computer world and to mention the comprehension problems we have until we can develop our individual education in this sphere.

I bought my QL *et al* in September, 1985 and have since been a self-taught student of the art. I have, led mainly by good advice gleaned from *QL World,* bought a dozen of the excellent Bradbeer, Glentop and Blueprint books and have joined the Eidersoft Support Service. They have proved invaluable; as a consequence I may even be ready to return to the QL User Guide. In summary, I am now reasonably competent at basic level with the Psion programs, which illustrates the level of ability to which I allude.

I feel that unless I and others like me am more able to understand the contents of my favourite monthly we are unlikely to proceed much further. I understood scarcely anything in the August, 1987 issue.

I appreciate that you must cater for the majority but could not some section be introduced which could lead and encourage the less knowledgeable? The main difficulty, I believe, is in the necessary use of jargon and abbreviations.

A few examples of comprehension blocks which I experience may help to show what I mean. What is a toolkit? They are constantly being written about and I have no clue what they do. Similarly, what is a compiler, and Editor? Nobody explains this to the novice. What are the programs which are written about in Utility File? The technical man may understand why one might buy QL Turbo + Quill or QLOAD but I cannot.

Turning to pages 50 and 51 of the August, 1987 issue, Watch the saves and Avoid horrible risks. The language seems simple, the articles helpful enough, but what was the problem and what are the additional translate facilities mentioned in the second piece? Finally, on page 56 Mail Merge which/what are listings one, two and three?

I hope you take my observations seriously as I wish to be able to glean assistance and valuable advice from your pages but truly find a technological barrier. I do not think it would be fair to suggest that the technical articles should be reduced to basics; you would need a 200 page booklet each month and would lose many disenchanted readers. I would suggest either editorial clarification or a section each month which would seek to edify the uninitiated.

J H Witherow.

● *Editor's Reply: I appreciate your problem. The content of* QL World *is designed to reflect the market and the wishes of readers. Being a rather introverted market containing many hobbyists and programmers, the jargon and articles tend to be specialised. We have been considering a less technical column, so how about sending details of what you would like to see? Remember, the more letters the better the chance of the column appearing in the form you want.*

As to the Mail Merge program, the listings were unfortunately not labelled as they should have been. Listing one is the Mail Merge program. It is followed by listing two, the Labeller, starting at line 100 at the bottom of page 56. Finally, the example listing three starts at line 1 in the second column on page 57.

Lack of design

About one year ago we bought Xchange to run on IBM PCs. We had previously been using the Psion programs supplied with the QL and had decided to take advantage of the additional facilities provided by the complete PC version. It was also hoped that the large number of PC users would provide us with a greater number of prospective clients who would be looking for specialist or tailored systems which we could develop using Archive, among other options.

Happily for us that proved to be the case but we were disappointed to find that the full version of Xchange Archive did not seem to include the printed page forms designer advertised by Psion. Exact wording in users' brochure was "Form Designer allows users to design screen and printed page; format comprises background form for input and output".

We contacted Psion and received a reply stating: "I am sorry to inform you that a 'printed pageforms designer' does not exist. The only way to generate reports is by using the LPRINT command". The fact that this facility did not exist proved annoying but it was possible to continue developing report modules using the slower and more awkward LPRINT command.

I have recently flicked through the August, 1987 issue of *QL World* and was disconcerted to find that the misrepresentation initiated by Psion in 1984 is still in evidence. The advertisementon page 39 states, regarding Xchange Archive "... multifile indices provide fast access and a form designer for screen and printed input and output".

I would be interested to hear of readers' comments regarding this or similar occurrences within the microcomputer field.

Neil Cresswell,
Bespoke Systems Software,
Rainham.

CHANNEL

LONG LIVE THE QL!

Impressive

I have owned a QL for around six months. I bought mine when Dixons was selling them for less than £100. Mine cost £70 because of the absence of a manual and I must admit to being most impressed with the system as a whole.

As a lecturer in computer studies, I spend a great deal of time with the more run-of-the-mill business systems like IBM and, believe me, they do not come much more run-of-the-mill than the PC. My business system is about the best of the bunch for that era of the PC in terms of enhanced features and is the ACT Sirius 1. Why industry has stayed with the old, outdated IBM concept so long is an historical rather than logical matter and goes some way towards explaining the QL's lack of success.

I read an interview wherein Sir Clive Sinclair was questioned about the QL's comparative failure. His excuse that the QL was too much too soon struck me as being both patronising and largely incorrect. Certainly it was not sufficient reason for Sinclair to go back to the ancient Z-80 running the even more ancient CP/M, lap-top or not.

The QL never had a chance of repeating the success of the Spectrum. I believe that Sinclair misjudged the market badly. He must have reasoned that the mass market, having been exposed to the wonders of computing, was ready to do something sensible with the power rather than continue zapping the same old aliens in admittedly varied formats.

Had he looked carefully at the business market he would have seen that even business systems had then, and have now, the same kind of juvenile software available. As a scientist and innovator the man is a genius; as a marketing man he did not appear to be in Alan Sugar's class.

I have yet to see the equal of the QL as a design concept. As a usable tool it shares a similar problem to the Spectrum and ZX machines – poor keyboard – but the goods inside the machine are far from poor. As a newcomer to the QL I can appreciate its merits by comparing it to the new designs. Qdos makes MS-DOS and CP/M look decidedly dated.

I still marvel at the computer press making so much of the Sinclair decision to use 8-bit RAM for a 16-bit processor. The reviews were probably written on a machine which had been using the same design concept for some time with no adverse reaction – the IBM PC. The furious press condemnation of the Microdrives as unworkable reminded me so much of the adversity which has beset all scientists since they committed heresy by declaring the world to be round.

John Masterman, Hartlepool

U.S. Viewpoint

I am a subscriber through a dealer/agent, Sharp's Inc of Mechanicsville, VA, U.S.A. I wanted to commend you on the magazine, its content and quality. As you may know, the U.S. version of the QL had just reached our shores and completed FCC tests to be marketed when Sinclair sold to Amstrad. A+ Computer Response in New Hampshire acquired all the stocks and has been selling them through a limited group of mail order dealers.

The only national QL exposure, except for Timex-Sinclair User Group newsletters, has been in some one-man - produced magazines. They include *Time Designs* magazine, *Quantum Levels*, *CTM* – formerly Computer Trader Magazine – and two others. With the possible exception of CTM, none would be found on a news stand. As you may have gathered *QL World* and the Quanta User Group magazine are both very welcome in the U.S. for famished QL owners.

Keep up the good work and do not stop publishing programs listings to type in, as this is the only way to learn SuperBasic by example.

Bob Howard, U.S.A.

Paper policy

I was surprised to read in the August, 1987 issue of *QL World* that you were advising QL users seeking thermal paper for the Serial 8056 printer to try Dixons. recently I visited various branches of Dixons in Manchester and Wigan in my quest for paper. The reply at all branches that they were out of stock and were unlikely to re-stock.

The sales staff displayed a generally disinterested attitude and did not seem perturbed by the fact that a printer without paper is not much use. I was somewhat perplexed by this in view of your advice. Perhaps Dixons has different regional stock ordering policies?

I am finding thermal paper very difficult to obtain in this part of the country and have tried most of the major department and electrical stores in Manchester, Blackpool, Wigan and Bolton areas. My usual source of supply is Boots the Chemists but it presently out of stock in this area. The larger branches have until recently stocked Brother thermal paper in both roll and pre-cut A4 sizes.

A4 roll is slightly too narrow for the 8056 but can be adapted by the simple means of cutting the ends of the central spindle of a used roll and glueing them to the ends of the central spindle of the new roll. Once the paper has been adapted to fit the printer there seem to be no problems when using the narrower A4 size with Quill, Abacus and Archive.

The quality of the 8056 varies greatly, depending on the quality of paper used. The Brother paper is the best I have found. Dixons paper does not tend to do justice to the printer, the quality and sharpness of the type being highly erratic and occasionally no print appears at all.

Gareth Boote, Wigan.

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TROUBLE

A PROBL

Many users may have little idea of what is involved in dealing with letters and telephone calls. *QL World* has several regular features answering letters and the time spent is comparable with that required to assemble the magazine as a whole. For that reason it has been necessary to advise telephone callers that only letter enquiries can be entertained.

Only a selection of letters can be answered; where a letter highlights a problem which may interest many readers it is worth printing a response but an obscure enquiry is unlikely to be dealt with, in general. Remember that virtually all enquiries received should have been directed elsewhere in the first instance – the problems were not created by the magazine – but we do our best to answer queries on behalf of suppliers, software writers and hardware manufacturers. Exclosing a SAE if a reply by letter is desired helps keep down costs and allows more enquiries to be dealt with.

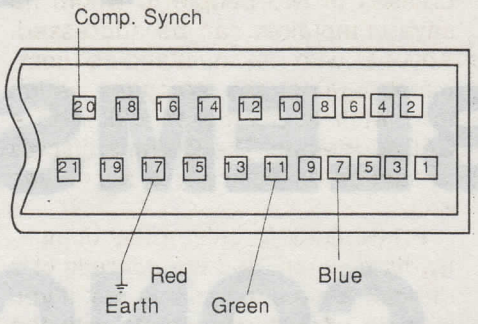
High prices

Have any overseas readers found that their local shops are charging high prices for software produced in the U.K? The question was prompted by a call from a supplier who had been told that the price paid for a program at one shop in the Netherlands was about 70 percent higher than the U.K. price. A shop buying even small quantities from a supplier would get some discount and the shop in this case might have been marking up the price paid by about 100 percent.

As the shop concerned had not ordered the program from the original supplier there is also the question of whether or not the copies being sold had been pirated, in which case the buyer might have difficulty in getting upgrades.

There has been an upgrade of the ROM in the Thor 1 to version 4.21, which allows programs using the Keyrow function to work. For those having version 4.10 ROM the same result can be obtained from a 4.21

Figure 1



Prism connector, seen from the outside

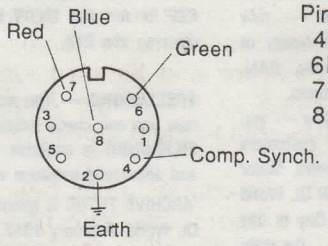


Figure 2
Wire colours:
Pin 2 Green
4 Yellow
6 Red
7 White
8 Purple

QL connector, seen from the outside

Figure 3

Connector pins (PCB wiring)	
BT	D
1	1
2	2
3	3
4	4
5	5
6	9

Equivalent connections for SER1 port on Samsung machines with "D" connectors

systems disc. These items are obtainable from CST. There is no guarantee that all such programs will now work. **M. I. Jackman** reports being able to use *Sign Designer* now but is still having difficulty with *QL Peintre* and *GrahiQL*. Can **Pyramide** and **Talent** offer any suggestions?

Problems with the Thor should be addressed directly to CST but do not expect the company to deal with all matters which concern just Eidersoft software. CST will be handling selling the Thor now for the most part; it sells through other suppliers but they are not the usual QL outlets.

Peter Tyler writes to say he has had six or seven once-used cartridges which have proved to be bad. Most were identified by a Psion version 1.0 program name. Cartridges made in the early days of the QL did not seem to meet the same quality standard as those made for version 2 software and it is no surprise to learn his comments. The lack of comment from other readers suggests there is no great difficulty with cartridges. Perhaps the price seems so low that a few rejects do not worry most people?

No-one has offered a circuit diagram yet for the Samsung Seri D connector and I have had to explore the serial port connections the hard way. Figure 3 shows a comparison between the BT and D sockets used on the QL PCB for the Seri port. As all the wires go to the same pin numbers, except for one. I had doubts about pin 6/9 but that was the way I found it on my machine.

Howard Clase of Newfoundland advises that he has found the wiring to pins 1-6 is the same for both BT and D, so be careful before making the one connection. The only difference of which I know between his QL and mine is that his is presumably a U.S. market version, whereas mine was made for Germany.

In case there are any users with two QLs networked with a printer attached to the slave, the way to print from Editor or Quill in QL1 is to alter the Print and Printer data files respectively and insert the relevant network designation of the QL with the printer attached to it, e.g., n2 Seri.

Both files can be altered easily after they have been read into Editor alternatively, Printer data can be altered by running the Install base routine and taking the non-standard port option, then inserting the network designation for the printer. Do not forget to key-in FSERVE on QL2 if you are using Toolkit II, I use TK2 in both machines but printing via the slave

SHOOTER

EMSOLVED

may still be possible with just the basic QL network commands.

Any offers

R. Mueller of Pietersburg, South Africa asks for programming hints, perhaps programs for *QSound/Q-Print* Any offers?

There are occasionally references in readers' letters to cartridges becoming corrupted by magnetic fields encountered during the mailing process. It appears to me that the readers are usually making an incorrect assumption; it is more likely the corruption is due to bad copying of files in the first place, or to faulty Microdrives or actions of the user.

Mueller sent copies of letters received from both U.K. and S.A. post offices, following problems he had with cartridges received from the U.K. and the responses were somewhat different.

The S.A. office said that it was unaware of equipment used by it causing problems with recorded tapes or discs; the U.K. office stated that "erasure . . . due to . . . magnetic fields . . . is not uncommon".

The U.K. office also stated that it is not aware of any equipment used by it, by airlines or Customs which would cause such damage. It advised sending cartridges "in a container designed specifically to shield its contents from strong magnetic fields". Cartridge and cassette manufacturers should be able to supply details of such containers.

In practice

When such items are despatched they should be identified as computer records or computer software. In practice, I cannot see suppliers going to the expense of using special packages, because buyers would not be keen to pay the extra cost, and because the proportion of cartridges returned due to suspected corruption by magnetic fields must be extremely low. It needs to be a fairly strong magnetic field to cause corruption but long-term exposure to a medium field e.g., leaving a cartridge close to a TV set or transformer, might cause trouble.

Chromagraphica. A reader has written providing the names and addresses of two people to whom he says complaints can be addressed. Anyone with an outstanding complaint against the company which they wish to pursue should send a SAE for details. The Chroma display is said to be basically a Microvitec unit.

Printerland. Details of this company, its position, and the address of a director have been sent to me. If you wish to pursue complaints with the company and require the information, please send me a SAE. We cannot vouch for the accuracy of the information but it seems reasonable.

Byteback. Another complaint has been received and no response has been received to any of the four complaints letters passed to the company. **W.D. Software** and **Xenon** have not responded to the single complaint letters sent to them, nor to reminders.

Eidersoft. The company has been split into two operations, one handling QL supplies, the other Atari and such. Do not contact Eidersoft Ltd on QL matters as the company is the one dealing with the Atari. The company for QL users is called **Eidersoft-QL;** the address and telephone number are given at the end. Inevitably, the change in management and personnel will mean that there may be delays in dealing with some matters and you are asked to be patient while the Eidersoft stock and administration is set up anew.

Good reputation

It is expected that most of the Eidersoft range of products will still be available. The people now handling this range have a good reputation for dealing with customers and they have been on the QL scene since the early days.

Microdeal reports having sent a replacement copy of *Land of Havoc* to **R. Mueller** in South Africa but is now sending another in case the first was lost on the way. It apologises to the customer for any inconvenience.

Disc drive repairs. If you send drive(s) to be repaired by **Akhter** it is likely to be returned set up as Drive 0 regardless of what it was when you sent it for repair. It is apparently standard practice to set all movable jumpers to the positions specified in the manufacturer's test procedure. That cost **P. Edwards** about £60 as he tried to find a non-existent fault in his returned drive by first replacing the interface, then taking the drive to another repairer, who noticed the incorrect drive setting.

Prism QL14 Monitor. **W. Newell** obtained a suitable lead for connecting this display to the QL from **Care Electronics** for £10.35. The lead is called RGB 8-pin to SCART (Euro). The display worked correctly with this lead. The instructions with the Prism are apparently sketchy but if **M. H. Mottram** would like a copy, he should send a SAE to me, for forwarding to Newell.

D. Redpath, G. M. Young and A. V. Williams sent details of the connections required – see figures 1 and 2. Thanks to the readers for the help. Both sketches show the sockets which are attached to the devices, as viewed from outside. As there were differences between the drawings sent to me, further comments on the wiring would be welcome.

Wire colours

The colours given are for the screen display, not for the sheathing of the wire used. If you have a standard Sinclair cable with 8-pin plug at the QL end and bare wires at the other, use the relationships between wire colours and pins given in figure two. The Prism was apparently based on the Fidelity ZX3000 chassis.

Suppliers

Radiospares
PO Box 99
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86 Commercial Road
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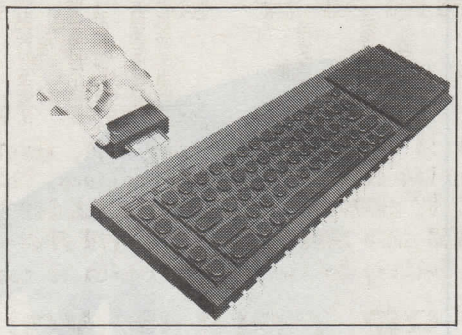
This advertisement was designed, and printed using Front Page Extra/2. Most of the character sets are available in the program as bought. The advert was printed using an MP165 printer. (Only £238 inc QL interface, VAT, p&p)

The Front Page series and Office Junior have been compiled using QLiberator by Liberation Software.

Thanks for the memory

Ron Massey looks at the differences between permanent and temporary computer memory



Although functionally similar, computer memory chips fall in either of two distinct categories, Random Access Memory and the Read Only Memory.

The names given to the chips are a misnomer, in that both can and usually are accessed randomly. From the users' point of view, the names are used to distinguish between temporary and permanent types of memory respectively.

From the computer point of view when it is looking at the internal data flow, a program can make RAM chips behave as if they were ROM chips. It is in this way that SuperBasic extentions are added by various toolkits as if they were part of the QL native language.

To keep power supply requirements to minimum the most common type of RAM chip used is called a Dynamic RAM. DRAMs require a refresh cycle, during which time its data contents are, in a manner of speaking, re-established.

There is one important difference between the two types of chip – data content of a ROM will remain constant, whether the computer is powered up or not, and it cannot be altered without specialised equiment.

The internal structure of a ROM is similar to a very complex matrix fuse-type board, in which, during programming, individual fuses are blown, or not, to represent a digital logic 1 or logic 0.

Programs held by ROM chips, such as the QL operating system, are blown on to the chip by a special machine and are not alterable subsequently. Because manufacturers of computers and their peripherals must order ROMs in large quantities, programs destined for ROMs must be completely bug-free. It is for that reason that special types of ROM chips are used.

While a program is being developed it is common practice to use any of several types of re-programmable ROM chip. The most common type, the Electrically Programmable ROM, has individual bits set by electronic pulses and is erasable by prolonged exposure to ultra-violet light.

Early QL

The operating system of the very early QLs was programmed on this type of chip. As the ROMs progressed through de-bugging and various version releases, they were burned on to permanent ROM chips.

To prevent possible confusion with reference to ROMs and EPROMs, references to either will be used in this report interchangeably. Although there is considerable difference between the two types of device from an electronic point of view, readers should appreciate that, functionally, they serve the same purpose.

A ROM slot, located at the rear of the QL, allows users to put additional ROMs on-line, as if they were part of the native operating system. Complete sub-systems such as *ICE, MICE,* EPROM-based monitors such as *ROMON* available from TK Computerware, a number of useful toolkits, such as the QL jump *Super Toolkit II,* Sandy *CPMulator* and a host of other add-ons can occupy this slot.

Each time the QL is re-set, it checks for ROM drivers. The availability of add-on ROMs is identified by the long-word flag 4AFB0001. If the flag is set the QL will link in the additional procedures from the ROM of the operating system. Allocated address space at 49152 to 65536 (decimal), or 0C000 to 10000 (hexadeciamal), provides 16K of additional "permanent" program area from which programs usually are intialised by keywords.

Virtually every EPROM-based QL add-on available is supplied in EPROM cartridges produced by Care Electronics.

A compact and unobtrusive black box, connection to the QL is made through part of the cartridge printed circuit board which protrudes through the cartridge front edge. Fourteen tracks on each side of the PCB transfer the data to the QL.

In spite of being the most advanced home and small business micro at the time, the QL suffers a failing common with products built to a price the sockets used to connect the QL to the outside world will not withstand wear.

It is a sad fact that ROM and expansion port sockets are particularly prone to becoming unreliable if devices are changed frequently. Another problem the QL enthusiast often finds is that, with the wealth of EPROM-based programs available, frequent changes have become almost mandatory.

Taking the problem of premature failure of the QL connectors seriously, a number of solutions have been found.

One of the first adaptors providing the option of having a range of on-line EPROMs without the necessity of frequent component exchanges, the German-based company Ultrasoft produced its Multi-EPROM adaptor which is connected to the QL in the same way as the conventional Care cartridge.

The Multi-EPROM printed circuit board includes provision for installing one to six EPROM chips removed from Care cartridges. When installed, its 160mm. × 80mm. box is positioned vertically at the rear of the QL. A row of seven switches, each with an associated LED, puts selected EPROMs on-line. If a different ROM is selected the QL must be re-set, as putting a new ROM into the system mid-stream, so to speak, will always cause a system crash.

A principal weakness inherent in the design of the version of Multi-

EPROM reviewed is that its PCB connector is positioned near the right-hand side of the front face of the adaptor.

Overcoming the two problem areas of the Ultrasoft Multi-EPROM and, at the same time, adding a useful sub-system to the QL, Micro Control Systems has produced a multiple EPROM synthesiser, Multi-ROM, which uses RAM instead of ROM chips for portable storage of program data. Installing Multi-ROM requires the connection of a wire link inside the QL between the B7 terminal, in the expansion plug – the seventh pin from the front of the QL on the top row – to the right-hand terminal on the bottom row of the ROM socket. As the link is terminated at each end with miniature multimeter-type connectors, no soldering is required.

Once installed, the link provides a write-enable function enabling the

Thanks for the memory

CONTINUED

QL to download data into the Multi-ROM memory; the link has no effect on standard EPROMs. The QL case is then re-assembled and the final phase of preparation, prior to Multi-ROM installation in the ROM port, can be made.

The data held on standard EPROMs must be transferred to individual files on Microdrive or disc. This is done by switching off the QL, inserting each standard EPROM – i.e., as supplied in Care or equivalent cartridges – switching on the QL and, after pressing «F1» or «F2», typing:

SBYTES drive–filename,49152,16384

If the ROM image is different from the Multi-ROM current contents, the QL will perform a system software re-set automatically with the new keyword "WARMSTART". If the contents are the same, return to SuperBasic is made.

Several methods have been provided to enable you to perform a system re-set. A "warm-key" function converts the otherwise fatal «CTRL»«ALT»«7» key combination into a keyboard version of the Multi-ROM SuperBasic extension "WARMSTART". Either method will re-set the QL, by-passing the usual memory check.

The SuperBasic extension "RESET" performs the same function as pressing the QL re-set button; "WARM128" will re-set an expanded

"Anyone doing serious work with EPROMs will almost inevitably eventually acquire an EPROM programmer"

QL to 128K memory. An additional facility has been provided to allow users to run EPROM-based programs from memory; "RUN-FROM" allows you to load and initialise formerly EPROM-based utilities from a drive. A typical application of this function:

100 LOAD-FROM flp1-Toolkit-II
110 RUN-FROM flp1-qflash
120 RUN-FROM flp1-ProPascal

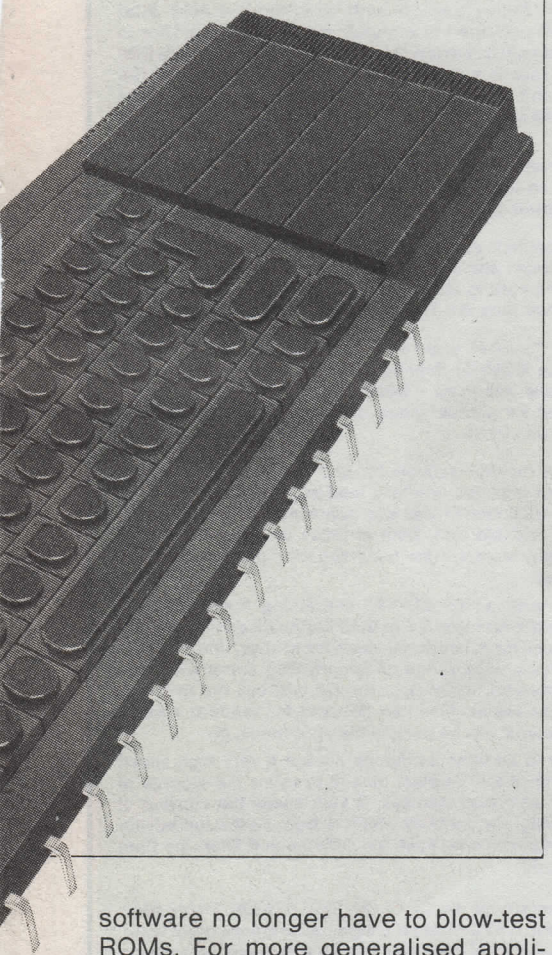
will load Toolkit II into Multi-ROM and re-boot. It will then load and intialise the Qflash RAM and ProPascal. Some position-dependent programs will not work with the "RUN-FROM" command because they expect to run at address C000.

Two programs known to fall within this limitation are Eidersoft ICE and the Metacomco C compiler, both of which will, however, run normally when used with the "LOAD-FROM" facility.

Also included in the Multi-ROM repertoire is a utility to provide a default device driver, enabling you to enter directives and filenames with minimal typing. As a safeguard, the DELETE and FORMAT commands require a specified drive but a specified default drive may be used with LOAD, LRUN, EXEC, SEXEC, LBYTES, SAVE, SBYTES, COPY, DIR, OPEN and the Multi-ROM extensions LOAD-FROM and RUN-FROM. Other device-related extensions have been provided to make life a little easier:

DEVLIST [channel] lists all the devices recognised by Multi-ROM.
ADD-NAME name adds a new recognised device to the list of devices.
DEFAULT device name allows the default device to the changed.
defdev$ is a function to return the current default setting.
EXIST is a function which may be used to test if a specified file exists.

Obviously, Multi-ROM provides a number of useful facilities. What may not be so readily apparent is that programmers developing ROM-based



software no longer have to blow-test ROMs. For more generalised applications, Multi-ROM provides an easy-to-use system which will, if you take advantage of the range of genuinely-useful EPROM-based software available, save considerable wear and tear on the ROM socket by eliminating the need to change EPROM cartridges constantly.

The release version of the Qflash Chip Board reflects a considerable degree of design sophistication. If you have either a standard 128K QL or internal memory expansion two Chip Boards may be connected in series through the expansion port on the left side of the QL, giving you the maximum total of additional ROM space of 256K.

If you have external memory expansion and/or a disc interface, your QL will accommodate only a single Chip Board. Your disc interface is removed from the QL, Chip Board is plugged into the expansion port and the interface is connected to the through-plug on the end of the Chip Board.

As supplied, Chip Board is configured to accommodate three 16K user-supplied EPROMs. Users have the option of having three 64K EPROMs instead but doing so requires that the master program to be blown on to EPROM must be sent to Qflash for a modification of the file header, identifying that it is an EPROM-based program.

Anyone doing serious work with EPROMs will almost inevitably eventually acquire an EPROM programmer. Even if you have had no previous experience with a programmer, you will find QEP III exceptionally easy to use. Every attention has been paid to the smallest detail with regard to both presentation and function. Shipped in an A5 case, accommodating both operation manual and the programmer unit, QEP III is held in position to the lid by a strip of Velcro. Occupying the QL expansion port, QEP III remains resident and may be invoked with either:

EPROM or **EPROM size**

where size is the working area to be used by QEP III. Defaulting to 64K, working area may be altered in increments of 1K.

Complete range

This versatile and flexible programmer is suitable for the complete range of 5-volt MOS and CMOS EPROMs from 16K – 2716/2516 types – to 512K – 27512 type. Three programming voltages are provided – 12.7, 21 or 25 volts.

Protruding from the left end of the programmer, a 28-pin Zero Insertion Force socket accommodates an EPROM – either a programmed chip, which is to be copied into the QL memory, or a new chip ready to be programmed.

A two-position lever on the ZIF socket, in the "Free" position, enables a chip to be dropped into place. Moving the lever to the "Lock" position clamps the pins with the unit contacts.

In addition to selecting the type of EPROM, pinout details may also be changed, allowing you to diverge from standard pinout allocations for address and data lines. Particularly useful, this feature allows PCB layouts to be simplified by allowing PCB tracks to be laid out as convenient rather than having to adhere to chip manufacturers' standard pinout conventions. EPROM-type and re-defined pinout configurations can be saved as a file to Microdrive and may be re-loaded as required. The QEP IIIuser interface consists of a combined menu and command system. Options are selected either by using the cursor keys to highlight the required item and pressing either «SPACE» or «ENTER» or by pressing the first charcter of the item. Throughout, pressing «ESC» will abandon a selected option.

Programming may be made at all locations in an EPROM or within a defined address range.

Prior consideration

As with all computer peripherals, prospective purchasers should give careful consideration regarding their requirements prior to buying add-ons; functional compatability with existing peripherals is important.

Typical of the consideration being referred to, to provide the user with the maximum memory expansion of 896K the Miracle Trump Card utilises the chip address from E0000 to FFFFF, allocated originally for additional ROMs, as RAM memory.

Trump Card users withing to have on-line EPROMs should consider either single EPROMs, of the Care cartridge type, the MCS Multi-Rom or the Ultrasoft Multi-EPROM adaptor as an alternative to the Qflash Chip Board. Users with either standard 128K or up to 640K expanded systems can opt to use any of the multiple add-on systems available.

It is my feeling that the ideal arrangement for Chip Board would be with a solely Microdrive-based machine, used with internal memory expansion. That is not to say that disc interfaces/external memory cannot be used but Chip Board precludes the use of the rear extension legs supplied with the QL.

You must also take precautions to ensure that the connection of your interface will remain integral to the QL while it is powered-up; failure to do so could result in damage to the electronic components of the interface, the QL or both.

A slightly less important consideration, displacement of the disc interface card by 70mm. required by the Chip Board width will expose most of the components of your interface. In my estimation, from the point of view of ease of use, presentation and its cost-effectiveness, QEP III must receive top marks.

This deceptively unassuming tool is the finest EPROM programmer I have used. there can be little doubt that QEP III represents the epitome of state-of-the-art EPROM programmers.

CAMBRIDGE SYSTEMS TECHNOLOGY

24 Green Street, Stevenage, Herts SG1 3DS
Telephone: Stevenage (0438) 352150

THOR

The Thor Computer System is a professional business machine designed with the user and his future requirements in mind. Cambridge Systems Technology have developed several models making the Thor extremely versatile: the single NEC 3.5in. floppy version with or without a 20M SCSI Winchester in addition to the dual floppy model packaged in a stylish metal case. The Thor is equipped with 640K RAM, parallel and serial printer ports, battery-backed clock and a separate IBM style (PC-AT) keyboard. Supplied free with the Thor is a specially commissioned version of the award winning Psion Xchange(*) software suite and a comprehensive manual. Special features of the Thor include multitasking at a single key-stroke and enhanced screen windowing representing excellent value for money.

THOR 20

The Thor 20 Computer System is the newest development from Cambridge Systems Technology, the very latest in high-speed processing. Based on the Motorola MC68020 processor, the Thor 20 delivers on average three times the computing power of the Thor.

The Thor 20 package includes a suite of development software comprising a specially commissioned macro assembler by Talent Computer Systems and a linker by GST in addition to the Psion Xchange* business software together with full supporting documentation. The Thor 20 Computer System provides a substantially higher performance than the Thor at a very cost-effective price.

THOR 21

The Thor 21 Computer System is designed for 'number crunching' applications. Based on the 68020 processor and additionally incorporating the MC68881 floating point coprocessor, the performance of floating point operations are dramatically improved – taking only 1% of the time taken without the coprocessor. This system is essential for a wide range of scientific and engineering applications and only costs an additional £201.25 (inc VAT).

NEW MONITORS

CST now offer a choice of monochrome or colour monitor suitable for use with the Thor range of computers. The Philips CM8833 14" colour monitor includes interface lead and screen. The philips 7502 12" monitor has a dark anti-glare screen, horizontal/vertical size adjustment, position adjustment, brightness and contrast adjustment and a foldable foot. Both of these monitors have been selected by CST from the wide array of available monitors for their superior performance and reliability when used with the Thor computer range.

QDisc Interface

The best-selling floppy disk interface is fitted with a 16K EPROM containing many 'Toolkit' extensions, and CST's Ram Drive 2. It may be used with most 3.5 or 5.25 floppy disc drives. CST's own twin slimline double sided 80 track 3.5 units being exceptional value for money, with 720K of formatted storage per drive. The Toolkit provides a wide range of SuperBASIC commands and functions designed to improve access to the powerful facilities of the QL without the need for machine-code programming. Job control is made easier, files can be used for random access, alternative character sets can be produced, 'wild cards' can be used in file operations, etc.

The Ram Drive device driver allows free memory to be used as though it were a very high speed disc in fact the fastest such device when used with the RAM-plus. Ideally used for the storage of temporary results, or multiple screen images for animated displays, it also eases the copying of files in single disc systems. The Ram Drive can only use memory which is free, so the full advantage is only felt if the QL is equipped with additional memory. Built into QDisc 4 and Thor, the Ram Drive is also available on 3.5in. and 5.25in. floppy disc.

RAM Plus

The CST RAM-plus unit expands the available memory of the QL to the limit of 640K. Using high grade 256K memory devices, this unit is the only one which offers the high performance of no wait-state operation. Housed in a rugged metal case, the RAM-plus unit has an expansion slot which duplicates the QL's, allowing any other CST peripheral to be used. Among the advantages derived from using the RAM-plus are the performance improvements of software and storage devices, and the ability to multitask several programs at once.

* Xchange is a Trade Mark of Psion Ltd.

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Additional 12m Service contract (1F&FF)	£85.25	☐		
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CST Thor TIMES CST
No. 871105

Thor XVI Thunders Ahead

The Thor XVI shapes up

THE DEVELOPMENT team at CST are pulling out all the stops to have their XVI series ready for the new year and firm orders are already building up, adding to the pressure. The ever cautious Manufacturing Manager, Graham Priestley said: "With the hardware manufacture now entirely in-house and to our own designs, we have a much tighter grip on quality control and assurance.

"Our use of advanced but established components means maximum reliability without sacrificing performance or security of future supply."

He said that CST's main aim is to ensure that the Thor XVI is as flexible as possible. This theme was stressed at the recent QUANTA meeting in Swindon by Dansoft's Hellmuth Stuven and CST's Proprietor, David Oliver, where the design of the Thor XVI was discussed with club members.

Planned Obsolescence

Many of the questions raised were on the often thorny subject of compatability with existing and future products. Oliver explained that company philosophy is to support existing and new customers into the future with planned growth rather than the planned obsolescence adopted by many of the high volume manufactureres.

Examples given were the continuing use of the Qdos architecture (albeit vastly enhanced), compatable hardwere interfaces and continuously expandable systems: for example, a user with a humble single floppy 512K machine can upgrade in stages to a 6.5 Mb system with a winchester and two floppies and remain in the knowledge that he will be able to incorporate new features as they become available.

Prospero Deal Agreed

RENOWNED software house prospero have rached agreement with CST to port their Pro-Pascal and Pro-Fortran 77 compilers onto the Thor computer range.

Due for release early in the new year, the new versions are fully validated implementations of these popular languages.

Protected

To maximise ease-of-use while guarding against "piracy", the compilers make use of the Thor's unique Watermark protection system to customise each copy to one machine without needing a "master" disc or rom to be present.

CST RAM – Plus leads the field

INDEPENDENT tests carried out by Digital precision on all leading makes of QL ram expansion show CST to be in front in the memory speed stakes. Their 512K ram almost halving the time required by the standard 128K QL from 33 to an unbeatable 17 seconds to run a test program.

This time is equalled only by the built in ram of the Thor range; figures for the Thor XVI are still under wraps but are expected to show even higher performance.

In the second edition of their TURBO ENCYCLOPEDIA Digital Precision state "We use and recommend the CST RAM Plus add-on board, which is well designed and the fastest 512K RAM we have tested."

Just for the record, the Thor 20 completes the same test in 4.5 seconds! This speed however is because the 68020 takes advantage of its high speed on-chip code cache rather than accessing RAM.

SPEEDSCREEN

SPEEDSCREEN makes the Thor display up to TWELVE TIMES faster using the new optimised code by Simon N Goodwin, designer of TURBO and SUPERCHARGE.

SPEEDCREEN requires no specialist knowledge to use, just load it! Displays look just as normal but are drawn much faster.

SPEEDSCREEN works with existing programs, without alteration, tests show dramatic improvements on: QUILL, THE EDITOR, COPY, LIST, PRINT, ED, VIEW, TURBO, ABACUS, ICE, FRONT, PAGE, PASCAL, C, FORTRAN, FORTH and lots more.

SPEEDSCREEN Pricing	
QL	£20.00
Thor	£29.90

Creative CodeWorks

Dear Hilde . . . THOR TIMES AGONY AUNT

I want to read 5.25 inch discs for the QL or IBM on my Thor. Can you help me to do this?

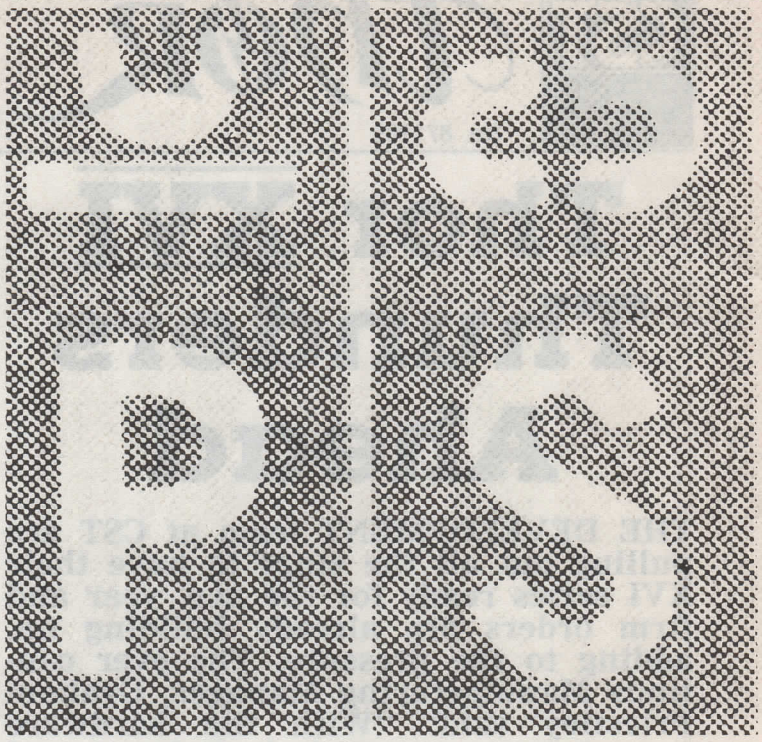
Yours hopefully
Disconcerted
Tunbridge Wells

Dear Disconcerted,
No problem! Try using a QDisc interface in the Thor's expansion port and FLP-USE. D.P.'s Media Manager program will cure your Itsy Bitsy Machine problem.

Hilde

Next Month: *Thor Ritzaus System Delivers the News*

Back to the future



Simon Goodwin adopts the role of history master in this special review

This article traces the history of the Psion packages, the four business programs supplied with every QL. It explains the differences between the many versions on the market, concentrating particularly on the later version 2 programs.

As with most complicated disasters, it is impossible to understand the behaviour of the Psion programs, famed for their bugs and slow speed, without knowing a little about QL development. Psion, the programmers, put in a vast amount of work on the QL packages since 1984 but most of that gallant effort was expended undoing the effects of the rushed decisions of late 1983.

The tale is not entirely gloomy, although recently Psion has forsaken the QL and concentrated on its successful yuppie electronic filofax, the Psion Organiser. Despite two years of development, the Psion *QL Flight Simulator* never reached the market but the last versions of the QL business software escaped and they include many useful new features, as well as corrections for old bugs.

I have noted the new features later and at the end I explain how you can upgrade your software.

When Sinclair demonstrated the QL to the press in January, 1984, the Psion packages were about the only QL programs which worked, or at least, appeared to work. Unfortunately that initial impression was rather misleading. Psion was a smallish London software house which had written some spectacularly successful games and utilities for the Sinclair Spectrum. Like Sinclair, it plotted a course upmarket in the mid-80s. It planned a suite of integrated business programs, individual programs which allowed data to be passed back and forth between them.

Integrated programs, or packages, were all the rage in 1983. MicroPro led the way with the *Star* family, *WordStar, SpellStar, CalcStar, DataStar, InfoStar, PlanStar, ReportStar* and so on, programs linked more by their names than their functionality. Then there was the *Easy* range, the *Perfect* package, and so on.

The Psion family was to be called *Xchange*, to emphasise from the start the way that data could be passed back and forth. In those days business programs were usually written in machine code, to get the best possible performance from limited memory and processor power, but Psion wanted to be able to move its programs between different types of computer, in particular from the QL to the IBM PC, so it wrote Xchange in C, a general-purpose language.

Psion software was developed on a large computer, a VAX supermini. That approach allowed the company to work on programs for many machines at once, even if some of the target computers were not yet finished. That was just as well, as Psion still had only a card-frame prototype of the QL, with a single Microdrive, when Sinclair first demonstrated the packages.

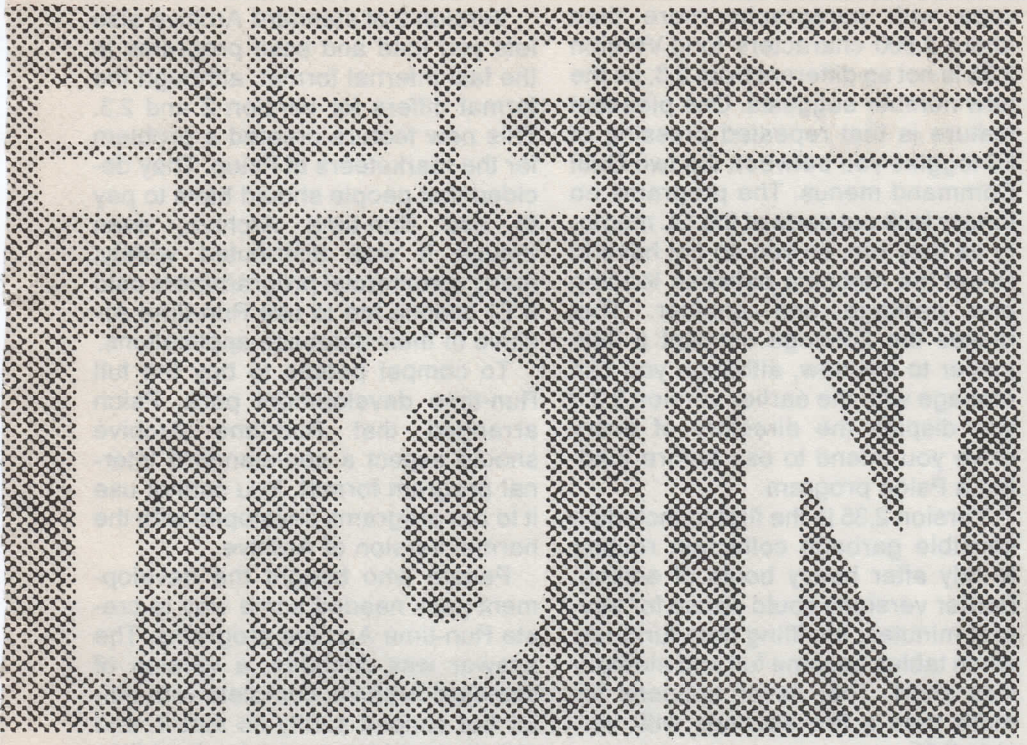
The VAX made the development of the Psion packages possible but it caused many performance and compatibility problems which made it easy for people used to simpler systems to sneer at the first QLs.

Programming in C is all very well for most of the code but it falls down when you reach the nitty-gritty pieces which talk to the hardware of a specific computer, the operating system. As I explained in the August *QL World*, the QL was meant originally to have an operating system called CP/M-68K, similar to the CP/M and MS-DOS systems used on earlier business programs.

Unfortunately, CP/M-68K needed a good deal of memory and the Psion C compiler emitted verbose code – it was not possible to fit packages and operating system together in the same QL. So Sinclair decided to replace CP/M-68K with an in-house development, – not because it was better, although it was – but because it was smaller.

Last-minute change

That last-minute change complicated things for Psion. To keep things compatible, it wrote an MS-DOS Emulator so that its C programs could pretend they were running on an IBM PC. Whenever they needed to access the hardware, the programs called the MS-DOS Emulator, which trans-



lated the IBM PC system calls into whatever that day's version of the QL needed.

The MS-DOS Emulator insulated Psion changes elsewhere in the system but the extra communication step slowed things. The compiled C program was already significantly slower than hand-crafted machine code. Even when the QL was running there was not sufficient memory to load an entire program into RAM, so the packages were set up to load routines piecemeal from Microdrive as they were required.

That was an inappropriate way to handle Microdrives, which take several seconds to get started. The drives were also slowed by the need to communicate through the MS-DOS Emulator. If reading started a moment too late the tape had to turn for seven seconds before the same block of data arrived again.

Q includes two neat tricks to speed Microdrives but the original Psion packages could not take advantage of either. Q can read binary files very fast with an 'LBYTES' operation. It reads each block from the tape and slots any part of the required file into the correct place in memory. LBYTES can usually search an entire tape in a few seconds.

Unfortunately, MS-DOS has no such facility. As the Psion programs pretend to talk to MS-DOS they must ask the Microdrive to search for each data block in strict sequence, ignoring other parts of the file they may pass en route and usually forcing many extra laps of the tape.

The other helpful feature of Qdos is the slave block, an area of otherwise unused memory which holds a copy of parts of the tape which have been used recently. When a tape is read or written the computer does a quick check to see if it can save time by using the slave block instead. Qdos needs two free slave blocks – one on late ROMs – to work and all except the latest MG ROM can crash if they run out of slave blocks completely.

Psion filled up the memory so that slave blocks were of little use; often the first version of the packages would lock up the machine by stealing the memory needed by the Microdrive handler. Psion could not predict problems like that by running the program on its VAX.

Short memory

Version 1 programs were not really suitable for serious use. File-handling was slothful and tended to crash the machine if memory was short. Problems in the duplication process made master tapes unreliable. Quill used to produce extra blank lines unless you selected 80-column display before printing.

It is not worth dwelling on the faults of version 1, except to make the point that you should upgrade them. Psion spent the second half of 1984 converting the packages to run on the ICL One Per Desk and the IBM PC. QL users continued to struggle with version 1 for almost a year before Psion revised the QL programs.

Version 2 was generally much better than version 1, although some serious bugs remained and a few new ones crept in. The code was entirely re-written in machine code to make it faster and to fit all the program into memory at once, with extra space for data besides. The MS-DOS emulator remained, unfortunately.

There was much less risk of locking up the system by running out of memory and the programs loaded with EXEC, which uses the fast LBYTES routine. Sadly, they still would not multi-task because they grabbed virtually all the spare memory after loading, regardless of the capacity of the system. Nowadays you can run several packages at once but you need a front-end program such as *TaskMaster* or *QRAM* to make sure that memory is shared fairly.

Version 2 lets you select the type of ordering used in Archive and Abacus. You can choose ASCII ordering, compatible with most other computers, or pick the QL's wierd but useful scheme of interleaved lower-case and capital letters. Printer and screen format configuration programs were improved but had to be converted from version 1 format.

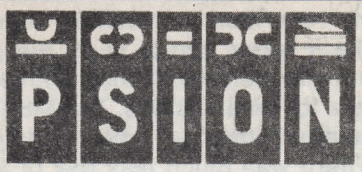
You can configure version 2 programs to use non-standard printers and interfaces. It is also easy to tell the programs to read data and help files from disc, although the screen prompts still refer to Microdrives. Previously you needed a CST utility to convert version 1 programs to run from disc.

The new Quill was much less likely to lock up the machine than version 1 but it still had a few non-fatal bugs in its handling of the text and status displays. Inserting text starting with a Tab could cause odd results, as could deleting the last character of a paragraph or inserting a new line in certain places.

A last-minute improvement for version 2.0 of Quill was intended to speed data-file handling. It worked very well unless files were more than 32K long, in which case SAVE and BACKUP would invariably fail with a plaintive file I/O incomplete report.

Copying, deleting and typeface changes were made easier in Quill version 2, as you could move back if you selected too large an area accidentally. Those options still re-draw the screen over and over again, so they are still slow.

Archive 2.0 had some serious bugs. Like Quill, it could not write files of more than 32K. LOCATE and NEXT could get lost in ordered files and sometimes ORDER would fail to sequence large records correctly. ALTER worked well in version 1.01 but version 2.0 had a tendency to du-



plicate some records and delete othere as it went along. Unstructured programmers could crash the machine by adding 256 lines to any procedure.

New features in Archive version 2 included the option to trace programs by pressing F3 while they run and a command to re-direct printer output to any device. New functions allowed formatted printing and direct manipulation of field names inside programs.

Version 2 of Abacus offered an extra 8K of memory for programs. It was fairly reliable but still had a tendency to get confused about the screen mode when deleting data or loading a new file.

The revised Easel was faster than version 1, had two new printer drivers and left an extra 4K for data. It could still crash if you asked it to show all possible graph formats when memory was almost completely full. Version 2.0 let you choose the scale of graphs, rather than tolerating a scale set automatically to match the data values. That makes it much easier to compare several graphs or to present misleading information, TV documentary style.

Psion patches

Psion produced patches for the most serious new bugs introduced by version 2 and they were incorporated into an interim release version 2.1. It was a vital upgrade for people hoping to process large files with Archive and Quill, although it slowed the handling of small files.

Version 2.3 was the next full release and fixed all the problems with version 2 which I have noted so far. Version 2.3 also allowed files to be transferred between packages over the QL network.

Version 2.3 adds yet more printer drivers for Easel. It copes better with curious or anxious users. It is no longer possible to lock the machine in a continuous loop by asking for Help about Help about Help.

The Quill 'Import' command is improved, in that you can choose whether to import 'by line', when each line read becomes a paragraph, or 'by paragraph', where each group of lines becomes a paragraph. Bad stylists and ungrammatical programmers, beware – Import cannot cope with paragraphs more than about 3,800 characters long.Version 2.35 is not so different from 2.3, as the new number suggests. One pleasant feature is that repeated pressing of F3 toggles you between the two Quill Command menus. The programs no longer lock out parts of the QL memory as they run, so you do not have to re-set the machine between loading one package and another. That makes the Xchange concept a little easier to swallow, although you can manage with the earlier version 2.3 if you display the directory of every drive you intend to use before loading a Psion program.

Version 2.35 is the first to include a sensible garbage collection routine to tidy after heavy bouts of editing. Earlier versions could pause for several minutes, shuffling data furiously when tables became full and memory was short. That never happens for more than a few seconds with version 2.35.

Minor corrections

There are minor corrections in all four programs. Quill can GOTO large page numbers without problems. Archive no longer tacks extra spaces on to REM statements when you edit them. Easel can 'Kill All Figures' properly and Abacus knows how to cope with empty cells when ordering a row.

There is one new feature in Quill 2.35, an 'Export' command which lets you write a document to a file which you can LOAD subsequently as SuperBasic, VIEW, or edit with other utilities such as *The Editor* or *HiSoft DevPac*. Previously the only way to export plain text was to 'print' the document to a file, using a simplified printer definition.

Version 2 of Archive left 20K of memory for programs and internal tables on a standard QL. That was 8K more than version 1 but still rather restrictive, particularly for people selling applications programs written with Archive. One of those authors was Chas Dillon. He persuaded Psion to produce a run-time version of Archive, stripped of the program editor and command line interface.

Run-time Archive has about 34K of memory free for programs and tables on a standard QL but it will not let you type-in commands or procedures. When you load Run-time it reads and executes the Archive program in the file BOOT PRO automatically. Run-time Archive has no editor, so all programs must be saved and loaded in an internal form, rather than as text.

Version 2 of standard Archive also lets you load and save programs in the fast internal format, although the format differs for version 2 and 2.3. This new feature created a problem for the marketeers at Psion. They decided that people should have to pay to use Run-time Archive, even though it was distributed widely; many commercial programmers paid a £1 licence fee to use Run-time Archive in their database applications.

To compel people to buy the full Run-time development pack, Psion arranged that Run-time Archive should expect a non-standard internal program format. You cannot use it to run programs developed with the normal version of Archive.

People who bought the development pack needed some way to create Run-time Archive programs. The answer was Archdev, a version of standard Archive, complete with editor but zapped subtly so that it, and only it, could produce tokenised files acceptable to Run-time Archive.

One exceptional feature of Run-time Archive is a machine code call instruction. It can be used to bypass the slow Archive interpreter at key moments. Dillon has used the feature in his Archive programs and managed to speed some operations by a factor of 400.

Run-time Archive includes features which have also found their way, undocumented, into the latest versions of standard Archive. The PDQL Archive Tutor gives full details. Eleven box characters can be used to design neat screen layouts. They are available by printing character codes 225-235. When designing screens you can type those characters directly by pressing F5 followed by a letter from 'a' to 'k'.

Print styles

It is also worth bearing in mind that Archive recognises MS-DOS control codes, so you can move the cursor, select print styles and clear areas of the screen by printing sequences of IBM PC control codes.

Archive was the only program which continued in development after version 2.35. That was almost entirely due to the persistence of Dillon. Archive uses an internal index table to keep track of your data. The data is left in the drive, so it is the size of the index which determines how many records you can handle at one time.

Each record in the file uses a single slot in the index. The size of the slot depends on the number of orderings imposed on the file – a minimum

of six bytes, plus eight bytes for each ordering. So if a file was sorted by name and price, each slot would take up 6+8*2 = 22 bytes.

Dillon discovered that Archive used 16-bit pointers to manipulate the index, limiting the theoretical maximum size of the index to 64K. What was worse was that some of the index code used signed numbers and some used unsigned ones. Large unsigned numbers would be treated as negative or positive at different parts of the code, scrambling the index if it grew beyond 32K in size. The consequence of the 32K limit are shown in figure one.

Archive version 2.38 allows the index to grow up to 64K without problems, allowing twice as many records as previous versions. Apart from that it is the same as version 2.35. The intervening versions, 2.36 and 2.37, were unsuccessful attempts to fix the 32K index bug.

Figure 1.

(Label) Maximum Archive database sizes

No. of ORDERs:	0	1	2	3	4	5
Version 2.38:	10800	4600	2900	2100	1700	1400
Vers to 2.37	5350	2300	1450	1070	840	700

The table shows the approximate maximum number of records, assuming that the QL has extra RAM. The maxima for a 128K QL are lower and depend very much on the program version, type – e.g., Archdev or Run-time – and peripherals in use.

There is no way beyond the 64K barrier, so the figures in the table show the maximum number of records you can manipulate with QL Archive. Even the QL clones, the CST Thor and the ICL One Per Desk, use the same 16-bit index.

Lucky readers

If you outgrow those sizes you will need to upgrade to an IBM clone and run the MS-DOS versions of Xchange, which allows up to 65,500 records and, naturally, has no need of the MS-DOS emulator. It costs £79.35, more than some lucky readers paid for their QLs.

Psion – 01-723 9409 – can supply upgrades for all four QL packages at £9 per cartridge. So far as the company is concerned, the latest version is 2.35 for everything except Archive, where it is shipping 2.36. It has no plans to produce further versions.

The snag is that Archive 2.36 still contains the very serious 'large file' bug. Archive 2.38 was not developed until after Psion ceased production of QL software. Version 2.38 is available from Psion but you can get it from Archive applications specialists PDQL – 021 233 3042. The price is a nominal £5. You should enclose an SAE and a blank disc or cartridge with your order.

The run-time and development versions of Archive are available together from Psion at £19.95 for the pair. Alternatively, for an extra five pence PDQL can supply the corresponding version 2.38 programs.

The development of the Psion packages epitomises the story of the QL. Many good ideas were thrown in a pot and the whole lot was emptied into a computer before it had time to gel. Almost four years later the position is very different. Psion received few thanks for its efforts – more a falling level of abuse – but now the packages are much better-suited to the QL. They leave more space for data, work faster and have few vices when used to process small files.

The packages are still rather slow, mainly because of quirks and the presence of the MS-DOS emulator, but QL suppliers offer a multitude of cures for those problems – fast expansion memory, RAM and floppy discs, The Editor, TurboQuill and Speedscreen. If you take care in setting-up your system, QL Xchange can beat packages on other computers hollow, on performance as well as price.

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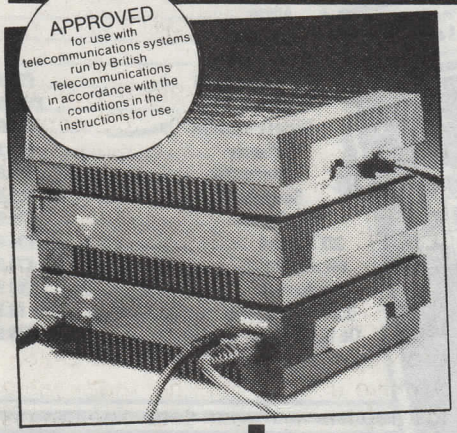

The only communications package for the QL. The modules are available separately but, by using all three as a complete matched system, full advantage can be taken of the integrated features.

Q-CONNECT

Complete RS232 output for general communications from 75-9600 baud with full two way buffering and flow control. Software on a micro drive to support all 3 modules includes Prestel Viewdata/Videotex and VT100 emulation, and many other features.

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EIDERSOFT QL

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ICE is a ROM based utility program that turns your QL into an ICON controlled "state of the art" computer. Not only does it add a number of functions not found on a standard QL including calculator and calender, it also makes all basic functions a dream to use.

ICE + MOUSE **was £79.95 NOW £59.95p**

The Eidersoft mouse combined with the above ICE rom gives your QL the power of the Apple Macintosh or GEM. Mouse control is implemented on all packages that use the ICE system, which gives a very smooth and fast response that will not be outrun. If you already have ICE we offer a £10.00 trade in if you return your existing ICE.

ARTICE + MOUSEART £14.95p

A keyboard or mouse controlled graphics program. The features include circle, line, box, free hand draw, paintbox colours and brushes, copy, transfer and save image. Epson printer dump, undo, spray can, recolour, text, mode 4 and 8 operation.

ICICLE £14.95p

A multi-tasking utility that allows you to set up your own ICONS for the control of programs, including QUILL, ABACUS and a host of other programs. As well as a full ICON editor it includes a printer spooler and printer manager.

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Set of comprehensive backup facilities which can be called up at almost any point when you are using your QL. It includes full wild card functions i.e. back-up all – doc or – pic files. The program also boasts a AUTOBACKUP feature backing-up specific files say every 10 minutes without you having to do anything.

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MONTH FOUR: Dealing with English

Leslie Fahidy looks at the teaching of English in the fourth part of his new series on education

Until now we have concentrated on the teaching of mathematics in this series; now it is time to look at the teaching of other subject areas. The most important topic, after mathematics, with which young children have to deal at school is English. All other subjects are important but mathematics and English have the central position in the educational system – the student must return reasonable results in both subjects to pursue an academic career. Young people cannot gain entry to any university course, or even most professional courses, unless they have a reasonable pass in O level mathematics and English, now to be superseded by GCSE results.

There are five areas in the teaching of English on which we must concentrate – vocabulary and spelling, grammar, comprehension, communication skills and punctuation.

Let us start with vocabulary and spelling and investigate the various techniques we may use to help young people to achieve proficiency. The aim is still the same as previously, to write computer programes which will help the learner to acquire the necessary knowledge in this area. There is a clear dividing line between the two areas of vocabulary and spelling and our programs should reflect the fact. After all, there is a distinct difference between somebody knowing the meaning of, say, pseudoscientific and being able to spell it correctly.

Ability to spell

The level of the student also has an effect on how far we should go in separating a knowledge of vocabulary from the ability to spell correctly. If the program is intended for young children, say in the 10 to 12 age group, it is a mistake if the child does not know whether it is "receipt" or "reciept". The 'e' before 'i' rule is important but a student preparing for his 'O' level English would not be penalised seriously for spelling psychology as psichology.

There are a number of approaches to teaching vocabulary, without taking too much notice of correct spelling; let me outline some skeleton algorithms.

1. Games of the *Hangman* type are suitable at a lower level, with the added advantage that the learning process appears to be entertaining. Correct spelling does enter the playing of games of this type but, since we would normally apply this method on the lower regions of the learning curve, the words encountered most frequently are likely to be simple and they do not usually present a spelling problem. To make a game more interesting it would be a good idea to arrange several sets of data and to use them for different levels of difficulty. The program could be written in SuperBasic, almost without regard to the vocabulary to be used and a different 'RESTORE «line»' statement incorporated, depending on the level of difficulty chosen by the student, thus presenting different sets of words.

2. An alternative approach could make use of Archive. The program could be written in SuperBasic but there is no point in going to the complications of writing a database manager in Basic, when the tools are already available in the form of a very high quality database. The program could proceed as follows – a dictionary-type definition is presented on the screen and the student is invited to supply the necessary word. If the response is exactly as it appears in the database, entered previously by the author, the answer is accepted and the fact is acknowledged that a correct answer has been given.

Further search

If the response does not match exactly the content of the appropriate answer field in the database, a further search is undertaken which looks at all the different and commonly-made mis-spelt versions of that word. If it is found, the evaluation should state that the word was correct but the spelling was not. As a further embellishment, a list could be kept of all mis-spelt words and at the end of the session the student could be given further exercises to teach the correct spelling of all those words which have not been spelt correctly.

Needless to say, the success of this approach depends on the research which preceded the writing of the program and the compilation of the data to go with it. Not only must the vocabulary be correct, in the sense that it includes the words which the teacher intended to teach at this stage but, the most commonly-occurring spelling mistakes of that word must also be included in the data.

If the response entered by the student is not found, either as a correct spelling or one which is incorrect, the answer must be rejected and the correct answer displayed on the screen. If the answer contains a spelling mistake but is otherwise acceptable, the learner must be told that the answer was substantially correct but the spelling was incorrect.

3. Commerically-available spelling

QL EDUCATION

MONTH FOUR: Dealing with English

checkers could be put to good use in teaching spelling, though not vocabulary. The scenario could be along these lines -- present a screenful of text with deliberate spelling mistakes. Invite the student to make a note of all words which are spelt incorrectly and then apply the spelling checker to the same text and compare the errors noticed by the student to those words which are rejected by the spelling checker.

There are three shortcomings to this approach. The first is that we must rely on the spelling checker being accurate and I have yet to see a spelling checker which is. Admittedly, users of the QL are in a better position than users of many other systems – our spelling checkers are not usually written in American English.

The second shortcoming of the method is that since we cannot interfere with the software we cannot introduce evaluation of answers. All that will have to be left for the learner to deal with, which pre-supposes a certain degree of maturity. The third problem concerns the ever-present failing of all spelling checkers – they will accept words whose spelling, though incorrect, is correct for a different word. For instance, if the intended word is 'could' and the student spelt it as 'cold', the spelling checker would accept it, since that is a correct spelling in its own right. This problem cannot be overcome until or unless we have a context checker available at a reasonable price.

Difficult problem

Teaching grammar is a more difficult problem than the teaching of spelling and/or vocabulary. Two possible approaches are:

1. Present a sentence on the screen, asking the student to analyse it and enter answers. The expected answers could be held in a data file and compared to those given by the student. Some care would have to be exercised in the writing of the program since, in most cases, there are numerous answers which are potentially equally correct.

Suppose the question was: "What is the subject?" and the expected answer is: "Jack"; The following answers are equally correct and we must make sure that they are evaluated as such – a, "Jack"; b, "The subject is Jack"; c, "The subject of the sentence is Jack", and no doubt you could think of many others.

The technique available to overcome such a problem is keyword searching. In this case, we would designate the word Jack as the keyword and so long as it is present, the answer is deemed to be acceptable. Such techniques, however, are not without danger. Suppose the student's answer was: "Jack has blue eyes" it, would still be accepted, since the keyword appears in it but, clearly, it is totally meaningless in context and incorrect. Only the author of the software can make up his mind how to deal with such discrepancies.

2. Present on the screen a piece of text which contains deliberate grammatical errors and ask the student to type-in the offending word(s). An extension of this method would be to ask the learner to type the corrected sentence in full.

The Chambers *Modern English Dictionary* defines comprehension as "act of understanding or of including" and that is what comprehension, as a part of English language, means.

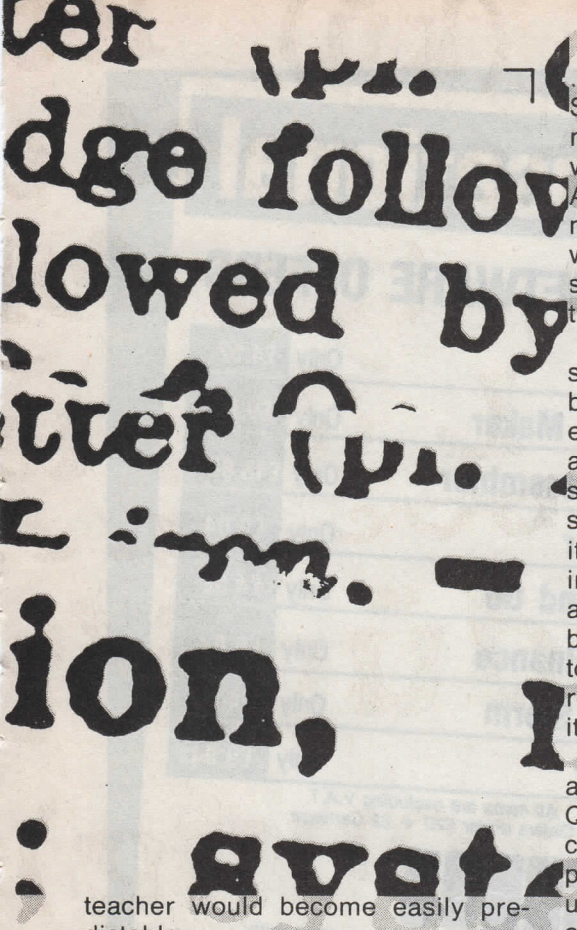
When writing computer programs, either to teach comprehension or to test a student's ability to comprehend, we are facing the task of helping the learner to understand and put into context what has been read. We need to present text on the screen consisting of several sentences which contain relationships beteen the different statements and ask questions such as: "Who came in through the door?", "Why was the dog barking?", The questions have to be such that it is possible to answer them, based on the material presented. At a higher level, we may ask a question, the answer to which is not stated directly in the passage which has been read, but it may be concluded. The passage may not include a statement explaining why the dog was barking but if it stated that the dog saw a cat across the street, it may be concluded that that is why it barked.

The basic body of the program should not present great difficulties; the main problem is, as before, how to accommodate various answers, each of which may be correct and, equally, how to exclude answers which could not be correct. It would be possible to write the whole program in SuperBasic but there is no need to punish ourselves with such a task. The QL is complete with an excellent database manager, which is programmable as well, and we could use it to provide the solution for our problem. The command language of Archive is a revised version of a highly-structured Basic, with the facility of almost unlimited screen editing.

Permitted answers

I suggest that two data files should be used, one containing the passage and the appropriate questions, the other the permitted answers to each of those questions. A great deal of research is needed to make sure that all permitted answers are included and I would advocate the provision of facilities to enable the user to add to the 'answers' database; somebody, sooner or later, is bound to discover answers which are perfectly logical but have not been included among the allowable answers.

Further, to make the task more interesting, I would suggest the creation of several database structures to give the user a choice of which to use. Alternatively, a random number could determine which data structure should be in use. Otherwise, unless a great deal of data has been incorporated, which means an extortionate amount of work, the comprehension



teacher would become easily predictable.

In a sense, communicating skills involve the exact opposite of comprehension. When dealing with comprehension the task was that the student should read a passage of text and demonstrate understanding of it. In communications skills, the roles are reversed. The student is presented with some facts and is required to communicate the imformation to a third party, without omitting any of the details or adding fictitious ones.

At the present level of computer technology, certainly within the bounds of the QL, it would not be possible to devise a program which can achieve those aims. Generating facts, from a series of pre-determined data statements, is not difficult in itself; the problem arises when we try to evaluate the responses. No computer program of which I can think would be able to read a passage entered by the student, compare it to the appropriate data, and test that all information has been included in it without distortion and that no new information has been added.

Tested by hand

That does not mean we should abandon the idea of teaching communications skills with the aid of a computer. I believe that the computer should be utilised, even if the checking of the resulting piece of communication has to be tested by hand.

The program could be written in SuperBasic, making use of READ...DATA statements and the RESTORE «line» facility. A random number could be used in determining which block of data should be read. Apart from that, a further random number could be used to decide which of the data items read in should, or should not, be included in the task.

If each block of data contained, say, 20 facts and using random numbers we chose only five of those, the exercise could be much less predictable, without the need to enter excessive amounts of data. The student should then be presented with the items of information which must be included in a piece of written work and those pieces of information could be printed-out to present a reminder to the student, as well as a point of reference for the person evaluating it.

Whether the student prepares the answer by hand, or decides to use Quill to produce the required piece of communication, is not of major importance. I would, however, state that using a word processor has certain advantages apart from the fact that printed text is easier to read than hand-written; the world for which we are preparing children will be such that a certain amount of keyboard skill will be necessary for all who want to hold a reasonable job.

While typing is not as yet on the curriculum of most schools, particulary not at lower levels, I would encourage all school children to use a typewriter whenever possible.

I would like to make one more point concerning the teaching of communications skills. It is normal practice in most of schools that, except when dealing with spelling, spelling mistakes made in written work are more or less ignored. There are good reasons for the practice and I do not wish to criticise it; when teaching communications skills, spelling and punctuation are important.

In last month's instalment, dealing with the teaching of mathematics, I emphasised that teaching with a computer should be restricted to the lower age and ability levels. Those restrictions do not apply to the teaching of English, except for the fact that all the five topics now considered are such that writing programs at a higher level involves a great deal of effort. Bear in mind, however, that the rewards are also proportionately greater.

A number of changes have taken place recently with respect to the accepted rules of punctuation. The changes may well be due to the punctuation used in many popular papers and have been adopted by more serious publications as well. What we must bear in mind is that, whatever the popular usage of punctuation, Examining Boards have not moved with the times and, consequently, we must teach punctuation in the old-fashioned way.

Two forms

The teaching of punctuation on the computer may take either of two forms.

1. Display a sentence on the screen without punctuation and invite the student to re-type it with the punctuation included. The evaluation of the response could be based on the same sentence, which is held in a different variable, with correct punctuation. The structure of the program could be straightforward; written in Basic, you compare two strings. If they are identical, the answer was correct, otherwise it was not.

2. An alternative method would be to display a text with incorrect punctuation and ask the student to correct it. Should you be able to think of sentences which have a different meaning, depending on the punctuation, that would present a worthwhile bonus. The structure of the program could be similar to the one in the previous case.

In both cases the program should be written without reference to the data file which holds the information and, when the program is run, the learner could be asked which data file to use. In that way not only will the test be more unpredictable but it enables the teacher to add new data files to the package.

Next month we will tackle another teaching topic, practical skills, a sadly-neglected aspect of computer education. A large number of practical skills cannot be taught on the screen of a computer but there are many which lend themselves to that treatment. Consider how many computer games you have seen which involve driving racing cars at high speed, round impossible bends. Is there any good reason why the same technique could not be used to teach young people how to drive safely and within the Highway Code?

You may have noticed that there have been no software supplements for two months. I have no good reason but the excuse is that I, too, must take time off occasionally for a holiday. I hope software supplements in Microdrive Exchange will be back in next month's issue.

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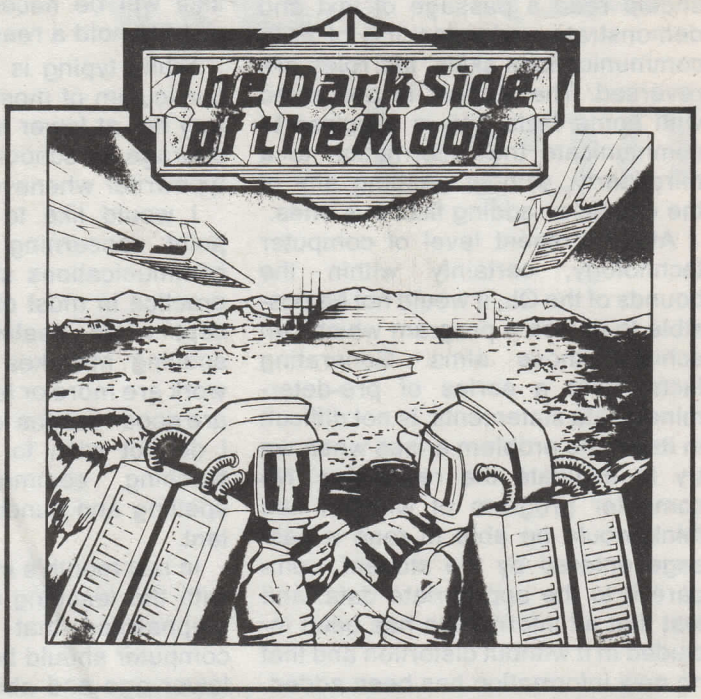

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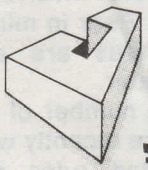

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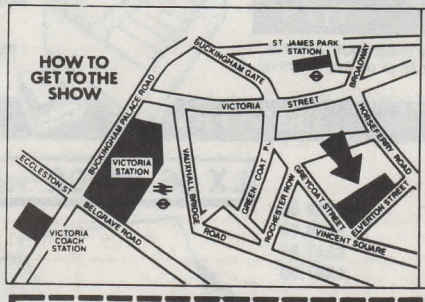

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Warship and Grandmaster Warship are, practically speaking, one and the same game. The latter title is a souped-up mega-version featuring an extended playing area for which you will require 512K RAM. This extensive and complicated version of battleships for a computer is but one of a complete series of games, 10 in all, but with the exception of this one, not yet written by Complex Data.

Like all wargames, the objective is to win and you do that by capturing cities. All cities initially are neutral and your tanks and troops can just roll in. Once a city is captured it can be set to work producing weapons of war to re-stock what you will inevitably lose in battle; you can even produce more troops, just like the real thing.

Although Warship initially seems to be very complicated the method of operation is straightforward and you can pick up things very quickly by playing. The introductory menu provides a beginner's game for this purpose, though I would not bother with the demonstration, which is utterly confusing.

You are provided with four fleets and each component, whether it is a submarine, an aircraft carrier, or whatever must be given instructions. A white cursor appears over the active vessel and relevant information such as its type, armaments, location, heading and speed are displayed. As well as changing direction, various other instructions can be given. You can launch aircraft from a carrier, disembark infantry or tanks from a troop or tank carrier. The main map screen also supplies other information, including grid references, the time and date, names of vessels and positions of other ships and islands.

Attacking the enemy is carried-out in true battleships style. By occupying a square on which they are resident the QL works out the odds and you are informed whether you are the victor or a piece down. Enemy ships cannot be seen until they are close to your own; unexplored areas of territory are similarly obscure, so a good deal of scouting around is necessary.

There is plenty to Warship and having played it for a few hours I get the impression there is much more to be discovered. It is certainly not superficial. There is more detail than I have outlined and I do not think even the most demanding strategist would be dissatisfied. The game can be played on two or more networked QLs, which opens some very exciting possibilities. Unfortunately the game suffers from amateurish production – mainly spelling mistakes and irrelevancies in the instructions – but that is something to which QL gamers have become accustomed. I am no wargame fanatic but despite being deterred initially by the complex and fussy detail, I found that Warship was well worth the effort.

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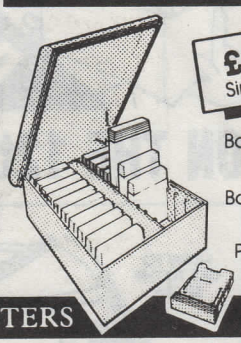

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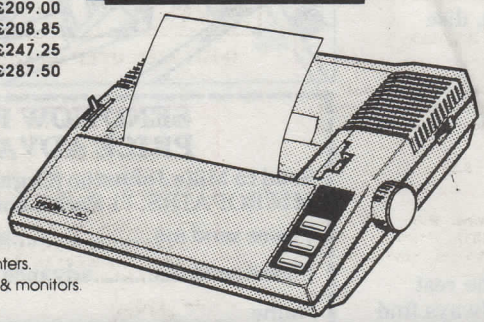

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The QJUMP Pointer Interface is the core of our development plans for the QL. This is the new standard in multi-windowing multi-tasking environments. It gives you mouse, cursor key or single keystroke control of your QL. Only QJUMP brings you a completely new environment for your expanded QL, providing non-destructive windows for any well written program (and most badly written ones too!) no menus to set up, no silly limitations, just CTRL C to switch between programs. This is the way forward for QL users, while most software will work with it, the best of the new software coming will not work without it. The QJUMP Pointer Interface makes your QL really work!!

QJUMP Pointer Interface Products

QRAM is the RAM based utilities package designed to get the best out of any QL with at least 256 kbytes of additional RAM. QRAM is the starting point for any Pointer Interface system. The QRAM menus pop up at the touch of a key to provide instant access control of your QL.

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QRAM	£29.90 (£26.00 export)	Available on Mdv / 3.5 / 5.25

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QIMI	£29.90 (£26.00 export)	£39.90 (£34.70 export)
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Watch this space for more QJUMP Pointer Interface products from QJUMP.

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QMON II Monitor/Debugger with single line assembler/disassembler, normal as well as conditional breakpoints, trace and backtrace, search, macro commands, transient windows and full window memory editor and much much more. "Das absolute Spitzenproduct" (68000er), can we say more?

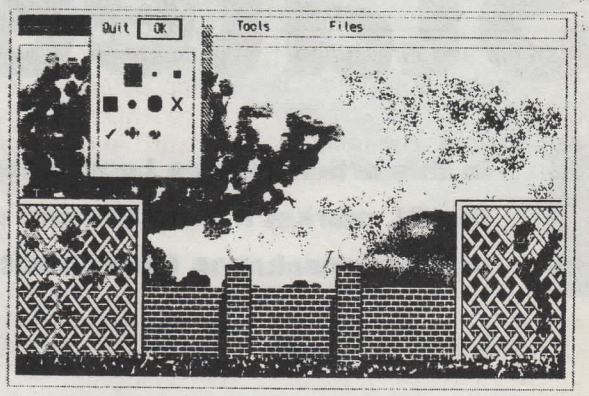
QMON II	£19.95 (£17.35 export)	Available on Mdv / 3.5 / 5.25

QEP III is the "Rolls Royce" (Sinclair User) of EPROM programmers. Many QLs have been bought just to use QEP III. Programs EPROMs 2716 to 27512, NMOS or CMOS. Features high and low voltage verification. Too many facilities to describe here, it puts £1000 EPROM programmers to shame.

QEP III	£129.95 (£113.00 export)

QJUMP can supply floppy disk drivers for those who have been left with unsupported floppy disk systems. Available for Medic (gets round many of the faults on some of the early Medic disk drives) and MicroPeripherals, version 3 or version 5 (provides compatibility with the rest of the QL world and improves performance).

QFLP	£14.95 (£13.00 export)	for Medic, MP ver3 and ver5



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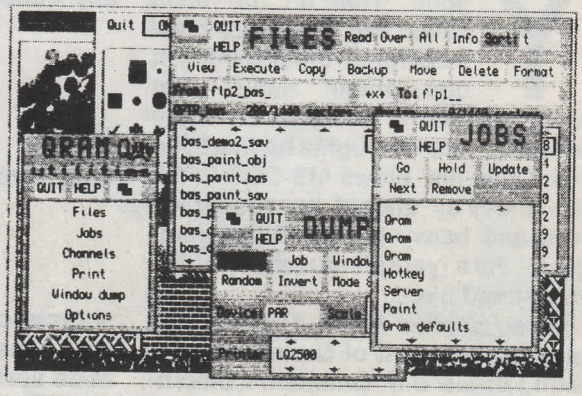
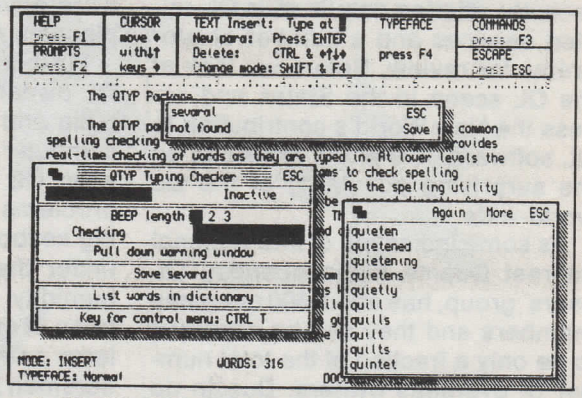


PAINT and QRAM showing FILES, JOBS and DUMP menus



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QL goes Stateside

In this article James Lucy takes a general look at the QL market in the U.S. and reviews a number of software packages from Quantum Computing

You better listen and listen good. That li'l old outfit called Big Blue sure blew it designin' that PC thing. It don' mean nuttin' that you'll find one in every office in the universe – the QL oughta be there, no bull. Qdos jus' blows MS-DOS in the dirt and y'all should be boning up hard and heavy on 68000 programming, 'fore ya get dumped in the brain-dead bin.

Or so implies Frank Toemay, the unequivocal head of Quantum Computing in the U.S. Quantum Computing contacted *Sinclair QL World* recently, offering details of its QL-related services and a number of programs for review. Before we look at the QL scene in the States and assess the New World's contribution to QL software, it is worth reflecting on the surprising popularity of the QL world-wide.

As some indication of international interest, Quanta, the independent QL users' group, has about 500 overseas members and they can be assumed to be only a fraction of the total number of overseas owners. Due in no small part to the efforts of Toemay and Tom Bent, another U.S. QL enthusiast, about 60 Quanta members may be found across the Atlantic in the U.S. and Canada. A further concentration is centred in Scandinavia and most of the northern European countries have a few tens of members each. Australia, New Zealand, India and various ex-colonial African countries seem to account for most of the rest.

Another barometer of international interest is the software written in some countries. France and Germany either have been or are major

sources of supply of some interesting programs, ABC Electronik and Pyramide springing to mind, and *Sinclair QL World* has even contained software advertising from as unlikely a place as Ankara, Turkey.

Further afield, Vaibhav Dahake is a QL owner from the Bombay area of India and tells me of an active local computer club with several enthusiastic QL owners; they have some problems, though, among them being keyboard membranes which wilt under the combination of heat and humidity and the three-times U.K. price of most QL items. Similar problems seem to be faced by the frontiersmen QL owners of Africa.

To return to the U.S. where climatic conditions are in the main less adverse, the other enthusiast mentioned and active in the QL field is Tom Bent. He reckons that the QL market in the U.S. is small, around 3-4,000 QLs, but nevertheless was producing until recently, and probably still is, a very informative and interesting journal with the name *Quantum-Levels.* Despite his enthusiasm, he accepts that he is in IBM and Apple heartland and that the QL is likely to remain a minority machine. Not so Toemay. Toemay also produces a remarkable catalogue for the QL, much more comprehensive and detailed than anything I have seen from the machine's native country. He offers almost every item of software available for the QL, a good range of hardware including the Futura and Thor, and even has plans to market Leon Heller's add-on Transputer board for QLs and PCs.

His style is to denigrate the architecture and operating system of the IBM 'cloneys', as he calls them, while at the same time describing the QL in terms which make me wonder if he is talking about the machine I know.

As a self-styled QL innovationist and visionary, Toemay obviously felt the need to market his own software. The programs are available in Europe from an organisation in Middlesex under the name Qmonix Code, priced between £10 and £15. What does a QL visionary produce when selecting software to publish? Let us look – and it is worth mentioning that these are pre-release versions.

Qcom Address book, £14

Not a good start for a visionary. What is the first program of which you think when you have graduated to using the filing commands in SuperBasic? Birthday list, computerised index to your record collection, or even an address book? When I tell you that this program is EXEC'd but requires the Qjump Toolkit II to be present, you should be able to guess that here we have a compiled Basic program which probably makes use of the additional filing facilities provided by the Toolkit. Suffice it to say it had the look and feel of a program developed by a home enthusiast for his edification and subsequently tidied for use by others.

The program provides a neat menu-driven environment for storing, retrieving, searching for, printing and sorting addresses.

Everything goes well until you have to enter your first address and find that addresses are in the American format. If you had designs on the State field for entering your county that is tough, because it provides only for the two-character State abbreviation. If that proves a trial, you can instead ponder what to do with the zip code.

Things are not much better when you use the program. The thing is not sufficiently error-trapped and, before you know it, there is the Q Liberator compiler error screen giving you information which is of no use, since

the SuperBasic source is not supplied.

Address book is a program which is of not really usable and in any case fulfils a function which can for most people be better served by a little pocket book and pencil. If you must have a computer version, spend a rewarding evening with Archive-filing information is what it is for.

Quantum Disc manager, £14

This program is available in a disc or Microdrive version, the disc version working only if you have two drives. Once again it requires the QJump toolkit. Effectively, the program creates a database of directory information from all your discs or Microdrive cartridges and then performs database services on it. As expected, you can search for programs and be told on which cartridge or disc they appear, you can print-out the list or you can view all files or just those on a particular disc. All work is again done through a neat menu system with moving-bar highlights, together with screen forms for input.

The disc manager imposes a filing system on you, assuming that all your cartridges are labelled from one to 1,000 and that you assign a letter to each cartridge designating the type of programs on it, U for utilities for example. It is again insufficiently error-trapped and it was not at all difficult to come face-to-face with the Q Liberator compiler error screen. This is no fault of Q Liberator, of course.

I would again question the point of this program. It is very easy from SuperBasic to list directories to a printer, or even a file, combine this with sensible labelling of discs and I suspect it would be rare person needing this kind of program.

Draw Poker, £10

This is the pick of the bunch, neat graphically with an element of addictiveness. Once again, it needs QJump Toolkit II. The game is a standard five-card draw poker, with five players. The QL will either play itself, or will compete against you while dealing the cards, keeping the score and so forth. The graphics are detailed but clear, at least on a monitor, and the speed of betting can be set to suit yourself.

Playing the computer and risking your money against the unseen faces and cards of the other players proved surprisingly addictive, certainly far more so than in the appalling fruit-machine simulations which are available.

Notwithstanding its expressionless face, the computer did not seem too good a player. Lacking ten-gallon hat, cigar and steely glint in my eye, I managed to amass a paper fortune, despite not knowing the difference between a straight flush and a U-bend. Anyway, I enjoyed it but perhaps a seasoned gambler would require more competition.

Keyboard Drill Sergeant, £10

This program could well serve as an object lesson in how to get software wrong. It purports to improve your keyboard skills but is repetitive, limited and misguided.

It is repetitive and limited because you get 10 runs at the same exercise, which consists of jabbing randomly-selected keys as fast as possible. In theory, it adjusts the speed expected of you according to your performance but in practice this was gross and insensitive.

It is misguided because it assumes that keyboard skills consist of hitting single keys sporadically and because it is so badly executed. The key you are expected to hit flashes,

making it difficult and slow to read; it is sometimes presented in the context of the other keys on the keyboard and sometimes not; silly and occasionally insulting messages appear on the screen if you fail to measure up to the program's unfathomable standards, and the whole awful experience is conducted to the accompaniment of an appalling and compulsory cacophony from the QL beeper. I think on balance this is one to avoid.

QL Kitchen aid, £14

This program is again a database written in compiled SuperBasic, this time storing recipes and recalling them at will. designed by a professional baker and former owner of frozen food, cake and pastry production companies. We are told that "the current professional field rendition of this program, running on a QL, is controlling the entire daily production of a large baking factory located in a multi-story (sic) building located in New York City". Good to hear that it works at altitude.

It does not seem to work at sea level, though, because my copy crashed regularly; in fairness, we are told that this is a preliminary version. It does not know a flp from an mdv, nor a par from a ser, has not heard of metric units, and is difficult to use for anyone other than, presumably, the designer.

Unless you want to beat your QL with dough-covered fists, another notebook and paper job, I am afraid.

Chequebook manager, £19

Another idea which does not befit a visionary. In the unlikely event that you want to sit at home and enter details of standing orders, cash dispenser payments, cheque payments, deposits, interest, service charges and so on, this program lets you do so and will tell you all about the entries you have made. Spreadsheets like Abacus are good at that kind of thing, too, and let you make prejections into the future.

Summing up

There is, I am afraid, a world of difference between a program designed from the outset to be a commercial product and one which has evolved from something intended for personal use. With the possible exception of Draw Poker, all the programs will serve only to reinforce the low opinion of the QL typically held by the unconverted and will therefore be counter-productive in Toemay's evangelistic campaign.

On the other hand, the QL community should be grateful that in the most important computer market in the world, the QL still has some dedicated supporters who are prepared to put money and effort behind the machine. The Quantum Computing catalogue is excellent, prices are good and from what I have heard, service rivals U.K. leaders like Qjump and Strong.

Addresses
Frank Toemay
Quantum Computing
Box 1280
Dover NJ 07801 | U.S.A.

Tom Bent
Quantum Levels
4016 Flicker Place
Columbia MD 21045 U.S.A.

Quantum Computing Qmonix software from:
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TOOLS

THE ULTIMATE BASIC EXTENSION

No toolkit has ever before ventured so far to bring out the super computer abilities of your QL. There now follows a brief description, if you want more details please do not hesitate to write.
First of all the toolkit contains all of the mouse commands that are detailed above together with new ones that provide on screen pointers controllable from either the mouse or the keyboard.
A 32 Icon fully definable enviroment is provided to be from within your own programs making them simple to use and even more user friendly than you thought could ever be possible.
User definable function keys are at last brought to your QL, these can help make your QL a joy to use.
The character set is made fully definable and simple routines are provided to allow use from within both your own and other peoples programs.
A complete sprite system is provided giving you 32 super smooth fully controllable sprites each of which may have up to 16 frames of animation and they can even outstrip the QL when it comes to speed!!!
There are also lots of new graphics commands – many of them are duplicates of the existing graphics commands in all but one important aspect – patterns, instead of them drawing in solid colours or stipples, the new ones draw in one of 32 user definable patterns. Theres even a paint command that will fill any shape with any user definable pattern!!!
There are four screen dump routines provided in the toolkit. One of the most amazing aspects of this toolkit are the new desk top publisher style character routines. The four basic sizes of character each of which may be expanded to any size you want, you'll find no rough edges on our characters, unless you want them there.
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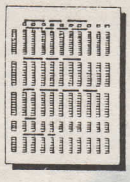

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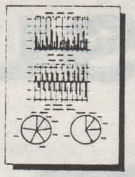

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SUPER BASIC

Mike Lloyd continues his series on data handling with an examination of vectors and arrays

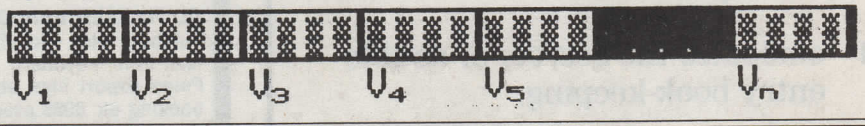
The only way the QL or any other digital computer can store information of any kind is by converting it into numbers and storing it in bytes of memory. Everything in a computer memory, whether it be strings, programs, character shapes, machine code routines or system variables, is all stored as 8-digit binary integers. By using a high-level language like SuperBasic, programmers are largely protected from having to consider data, of whatever type, in its raw, digital state. Such blissful ignorance can be a handicap and so this month's article is devoted to static data structures, of which arrays are the most commonly-known example.

A single byte is not a particularly useful storage medium because it can represent only 256 values. Nevertheless, it is often used as a pointer to tables of information. For instance, the command to print an ASCII character, such as *PRINT CHR$(65),* uses a single byte value, 65, to indicate where in the character font a particular character shape is located. The QL can also consider groups of two or four bytes, i.e., 16 or 32 bits as single entities giving maximum integer values of 65535 and more than four billion respectively.

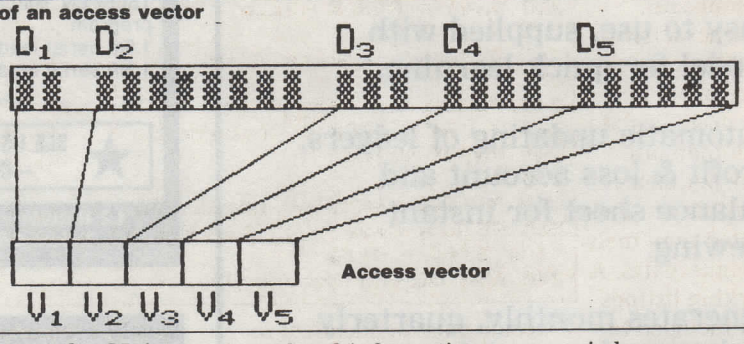
Bytes have two essential characteristics, value and location. To appreciate the importance of both features, consider the way the QL interprets the significance of a byte depending on where it is located in memory. In the ROM a byte might represent a machine code instruction, or an ASCII character in an error message, or be part of a symbol shape in the character font. In RAM it might represent a sequence of pixels in the screen area, the location of a file in the Microdrive map, a border colour in a channel block, part of a string in the variables area, or a reserved keyword in the SuperBasic program area. If the interpreter was not aware precisely of a byte's location the significance of its value would be lost. Such navigation errors on the part of the interpreter are a fairly common cause of system crashes.

Although a byte is the basic computer data store, SuperBasic users are more accustomed to considering variables as the irreducible minimum for data storage. When large amounts of similar related information needs to be stored, SuperBasic allows programmers to declare arrays of any variable type. The principles of data storage discussed apply equally to data held in SuperBasic arrays and data held in raw bytes, although the latter method usually uses memory more efficiently.

● Memory usage of a 32-bit vector Base address



● Principle of an access vector



Variable name

Conceptually, a series of bytes and a single-dimension integer array are very similiar. A variable name is merely a convenient way for a programmer to refer to a memory location, or more properly a series of locations, which store a particular value.

The relationship between locations is frequently more important than their position. That a bye is at memory address 524567 might not be so relevant as the fact that it is the fifth byte in a particular series. That is because many groups of information, or *data sets,* have natural sequential arrangements and computer data structures are most successful when they mirror the natural patterns of the information they are holding.

Names can be arranged alphabetically, values can be arranged in ascending or descending order, data can be recorded in the order in which it was entered or the order in which it will be used, and so on.

A computer data structure needs to store the elements of a sequential data set in an appropriate order to imply the links between them. Sometimes the links are more complex and need to be included explicitly in the data structure. This month's article, though, is devoted to storage structures where a sequence is implied by the position of the elements within a data set.

The simplest form of data structure is called a *vector.*

It consists of a fixed number of similar values arranged in a single dimension; it is also known as a one-dimensional array. A vector can be created by reserving an area of memory equal to the size of a single entry *size* multiplied by the number of entries required.

The start of the *nth* entry is found by calculating *n-1*size*. This is known as a *mapping function* or an *access algorithm* depending on whether it is used to add information to a vector or to find information within it. Figure one shows the concept of a vector.

Figure 1

```
100 REMark :      ESTABLISH A VECTOR
105 :
110 Elements = 200: REMark : No of elements
115 Size = 4      : REMark : Bytes per element
120 :
125 Base = RESPR (Size * Elements)
130 :
135 REMark : WARNING: The reserved area might
             contain spurious values, so do not
             assume that unused bytes equal 0
140 :
145 REMark : Example calls
150 :
155 POKE_L Locate (12), 586
160 PRINT PEEK_L ( Locate (12) )
165 :
170 DEFine FuNction Locate (Target)
175   RETurn Base + (Target - 1) * Size
180 END DEFine Locate
```

Figure 2

```
200 REMark : 3D INTEGER ARRAY
205 REMark Establish dimensions & reserve memory
210 :
215 Max_X = 7: Max_Y = 9: Max_Z = 6
220 Base = RESPR (Size * Max_X * Max_Y * Max_Z)
225 :
230 REMark : Locate value (2, 7, 4)
235 :
240 POKE_L Locate_3D (2, 7, 4), 513
245 Value = PEEK_L (Locate_3D (2, 7, 4))
250 PRINT Value
255 :
260 DEFine FuNction Locate_3D (X, Y, Z)
265 RETurn Base + ( (Z * Max_Y) + (Y * Max_X) + X
 ) * Size - Size
270 END DEFine Locate_3D
```

Counterparts

Some of the algorithms shown in the text have been simplified to emphasise their essential characteristics. Because of factors such as the existence of zero elements and the need for data to occupy more than one byte of memory per element, the true algorithms can look more complicated than their pseudo-code counterparts. A number of working listings have also been included to demonstrate how the pseudo-code algorithms can be translated into SuperBasic.

If any of the three essential criteria of a vector are not met problems may arise from using a sequential storage structure and it might be worthwhile investigating some other means of holding the data. Where data naturally occupies more than one dimension, multi-dimensional structures need to be devised. That does not mean, however, that the value of each element in a vector is limited to a single number.

Perhaps the most common example of a vector is a grid reference — *cf* the AT statement — which has two components. These would be stored in a vector as two successive bytes, the first relating to the X axis and the second to the Y axis, and the two bytes together are considered as an indivisible whole.

All the values held in a vector must be identical in type and occupy an equal number of bytes. In other words, strings and numbers cannot be intermixed and, particularly where strings are concerned, elements must all be the same length, otherwise the access algorithm breaks down. Fortunately, both real numbers and integers can be limited to a fixed number of bytes whatever their value.

Although values in a vector can change by being over-written, it is rarely convenient to insert new values. That would involve shunting down succeeding values and thus corrupting the access algorithm. Similarly, it is unlikely that adding new values continually to the end of a vector would be acceptable because they may not be properly ordered and there may not be room reserved for them.

Such inflexibility is a hallmark of static data structures – it is, in fact, what is static about them – but ultimately even dynamic structures such as linked lists are of finite length; inflexibility is not always an unacceptable disadvantage.

Extra Dimensions

The logical improvement to a vector is to add extra dimensions, although by doing so the term vector becomes inappropriate and the data structure is now termed an *array*. In SuperBasic, arrays are always rectilinear – a two-dimensional array looks like a rectangle, a three-dimensional array is like a cube – and can therefore be said to be composed of a number of individual vectors stacked together. The mapping functions for such arrays are very easy to establish; a vector can be doubled in length, say, by reserving memory with the formula:

*base=RESPR (size * elements * 2)*

The access algorithm to locate, for instance, the third value in the second vector becomes:

*(2 * size * elements)+(3 * size)*

The brackets are included for emphasis. In a two-dimensional array with dimensions *max-Y, max-X* the access algorithm to find a location represented by the co-ordinates *Ypos, Xpos* would read:

*(Ypos * max-X)+Xpos*

If an additional dimension were to be added of *max-Z* elements, the formula becomes:

*(Zpos * max-Y)+(Ypos * max-X)+Xpos*

The pattern could be extended to cater for any number of dimensions.

Not all data sets fit neatly into a rectilinear mould. A mileage chart provides familiar evidence of this. It is typically a number of towns listed both vertically and horizontally with a triangular set of boxes in which the distance between each pair of towns is recorded. A square mileage chart is possible but the upper right portion of the chart would be equal to the lower left portion because a feature of our road system is that the distance from Aberdeen to Winchester is the same as the distance from Winchester to Aberdeen.

SuperBasic is of no assistance when non-rectilinear arrays are required because vectors within an array must be the same length. Space for a triangular array which for convenience allocates only one byte for each distance could be established using the following formula:

base=RESPR (towns 2 /2)

The variable *base* would then hold the start address of the reserved area of memory. Towns would be arranged in alphabetical order in a string array, their location within it identifying where in the triangular mileage array the relevant distances lay. The distance between the fourth town, Bradford, and the fifteenth town, Leeds, for instance, would be stored as the fourth element of the fif-

teenth array at location:
*base+(15 * 15/2+15/2)+4*

The part of the algorithm in brackets calculates the location of the first datum relating to Leeds. It is based on the familiar formula for finding the area of a triangle – half the base times the height – converted to represent bytes rather than units of area. The general algorithm to disclose a location *(X,Y)* is:
*X * X/2+X/2+Y*

The value for Y must always be less than the value for X. It is interesting and convenient that the result of the expression is always an integer.

Another useful non-rectilinear array structure is the regular, or balanced, *binary tree.* A binary tree begins at the top with a single node which has two daughter nodes, each of which has two successors, and so on, until the lowest level of the tree is reached where the nodes have no daughters. A path through the tree can be traced using boolean logic – "true, false" or "left, right" or "0,1" and so on. A binary tree with X levels must have x 2-1 locations and a mapping function is relatively simple. The value located at the fourth node on the seventh level could be found by calculating:
7 2+4

In general, to locate element E on level L of a binary tree the mapping function is:
base+L 2+E

Binary trees are not always regular; many nodes might be missing and there may be more levels in one part of a tree than in another part. The simplicity of regular binary trees makes them worthwhile structures even when many of their nodes do not exist.

It would also be possible to create arrays with logarithmic dimensions, or based on a natural distribution frequency, or by using mapping functions of almost any complexity, but if such unusual arrangements of data were being handled it would be better to use non-sequential data structures.

A problem sometimes encountered is how to represent arrays consisting mostly of randomly-distributed zero elements without wasting memory. Such arrays, called *sparse arrays* or *sparse matrices,* can occur in networking and engineering problems. Zero elements typically would represent above 70 percent of the data before alternative forms of holding the information become worthwhile.

One method is to construct a bit-map to indicate where non-zero elements exist. The non-zero elements could then be stored sequentially in a vector. The access algorithm for the vector would depend on the number of ones which preceded the current location in the bit-map. A matrix of single-byte integers with 32 × 32 locations stored conventionally would occupy 1,024 bytes.

A bit-map of the same matrix would occupy only 16 bytes and if 200 of the locations held non-zero values a vector of 200 bytes would be required, leading to a total saving of 808 bytes. Space taken by the access functions must also be taken into account but large arrays can conveniently be compressed in this way.

Another solution might be to store values alongside their location co-ordinates in a small array – e.g., DIM Array% (200, 3) using the foregoing example. The access algorithm would involve looking at a location chosen by a rough guess and then searching round that location until the target value was found.

The methods of storing sparse matrices cannot cope easily with situations where values change from zero to non-zero, therefore fixed-length sequential storage structures must be abandoned and a solution found elsewhere.

Listing 3

```
300 REMark : Establish large data string
            with integer array as access vector
305 :
310 Store$ = FILL$ (" ", 1000)
315 DIM Vector% (200)
320 :
325 REMark : Hold "next free vector" in variable
330 :
335 Next_V = 1: Vector% (1) = 1
340 :
345 DEFine PROCedure Add_Datum (Info$)
350   LOCal Start, Finish
355   Start = Vector% (Next_V)
360   Finish = Start + LEN (Info$) -1
365   IF Finish > LEN (Store$): STOP
370   Store$ (Start TO Finish) = Info$
375   Next_V = Next_V + 1
380   Vector% (Next_V) = Finish +1
385 END DEFine Add_Datum
```

Listing 4

```
400 DEFine FuNction Fetch_Datum$ (Target)
405   RETurn Store$ (Vector% (Target) TO Vector%
(Target+1) -1)
410 END DEFine Fetch_Datum$
415 :
420 REMark : Example Calls
425 :
430 Add_Datum "Piece of Data"
435 :
440 PRINT Fetch_Datum$ (1)
445 STOP
```

Longest datum

Data is rarely in identically-sized or neatly-organised packets and therefore all the vector elements must either be equal in length to the longest datum, which can waste an unacceptable amount of memory, or the data must be stored in a different fashion.

To preserve some of the advantages offered by vectors, irregular data can be stored sequentially in one array and an auxiliary vector established to hold the address of the first byte of each datum. Such address pointers fulfil all the criteria of a true vector – they are of a single dimension, they are homogenous in type and length and they can be fixed in number.

Figure two demonstrates diagramatically how the two structures relate to each other. The additional overhead is typically two bytes per element and there is also a penalty in the extra access time required to retrieve a particular datum but those disadvantages may well be more acceptable than those of alternative solutions to the problem.

Auxiliary vectors, also called *access vectors* or *Iliffe vectors,* also offer advantages when string arrays have to be sorted. Because it takes time to shift large string array elements round in memory it is quicker to keep the string array in the order in which it was entered and add an access vector which can be sorted to point to the string array elements in their alphabetical order.

The next logical step is to combine the auxiliary vector and the data array into a single area of memory, so that each entry includes the address of its successor. Such structures, called *linked lists,* will be the subject of a later SuperBasic feature.

SuperBasic arrays are easy to understand, establish and use but for many applications they are not ideally-suited to the task in hand. By developing other static, sequential, data structures memory can be saved and, occasionally, access times can be reduced. These two advantages are often incompatible; memory is saved at the expense of increased access time and access times are reduced by compressing the data.

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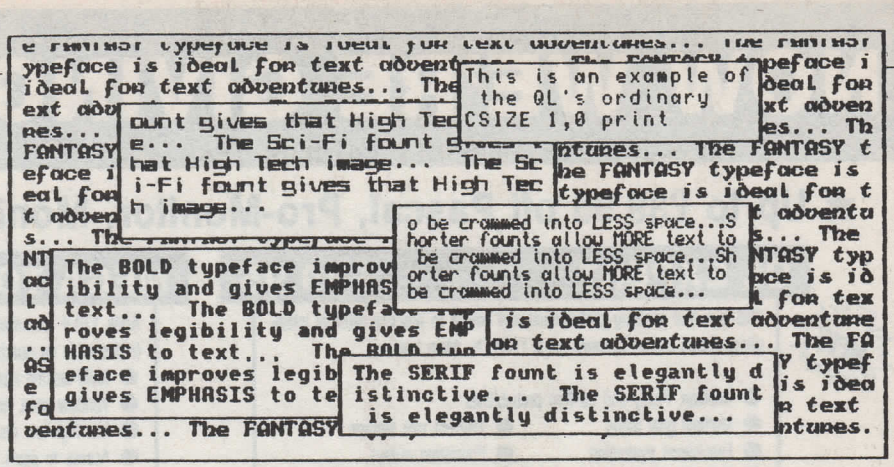


"Speedscreen will be very popular indeed."

Mike Lloyd reviews a well-thought-out, thoroughly tested, easy-to-use and sensibly-priced product.

Fast and

A criticism levelled frequently at the Sinclair QL is that despite its 7.5Mhz CPU it is, in fact, a slow computer. With its tardy SuperBasic tokenising process, slow program interpretation, leisurely Psion applications and snail-like screen-handling it is not difficult to find justification for the criticism.

So far the solutions have been program-specific. SuperBasic compilers or other compiled languages are in widespread use and applications have been re-written or patched or replaced by faster but simpler alternatives.

Close study of the voluminous Turbo compiler documentation reveals that its author, Simon Goodwin, has been developing a radical solution to the fundamental problem of slow screen-handling. The finished article is the Creative CodeWorks recently-launched *SpeedScreen* which accelerates screen printing by up to 12 times. As a result, applications as diverse as Quill, Abacus, QRAM, Front Page and the SuperBasic editing environment have been given new life.

CST has already announced that SpeedScreen will appear on future Thor computers with upgrades being offered to current Thor owners. Other licensing deals are in the offing and a limited variation of SpeedScreen is being licensed to software houses. SpeedScreen will be very popular indeed.

The exceptional feature of Speedscreen is that it is a generic fix for an all-pervasive problem rather than an improvement to a specific program. It is fully-compatible with Qdos and all other programs, it is completely transparent to the user, it works in all windows, including temporary Qdos windows, it requires no special computing ability or knowledge and it imposes no limitations on the user.

Prints fast

SpeedScreen prints text in either CSIZE 0,0 or CSIZE 1,0 at least three times as fast and typically around six times as fast as normal. Window scrolling can be accelerated under user control and both cursor and CLS operations have benefitted from Creative CodeWork attention. The fix also removes the annoying flicker which appears occasionally when printing blocks or scrolling windows.

The size of the QL 32K screen map limits SpeedScreen default scrolling speed to about twice as fast as normal but SpeedScreen circumvents this restriction by allowing the user to specify by how many lines the screen should be scrolled when the bottom of a window is reached.

The command -SCROLL 2, for instance, scrolls twice as far and half as often. Larger parameters are less smooth but the speed increase is dramatic. With a modest setting of -SCROLL 4 a 16K file can be copied from disc to screen in 10 seconds instead of the more normal 49 seconds.

SpeedScreen frees programmers from the limitations of the CSIZE command by allowing text sizes to be altered in steps of one pixel. Fonts based on grids of up to 8 × 9 pixels can be used rather than the 5 × 9 grid of the ROM font. Shorter characters allow more lines to be printed in a window but with some loss of legibility.

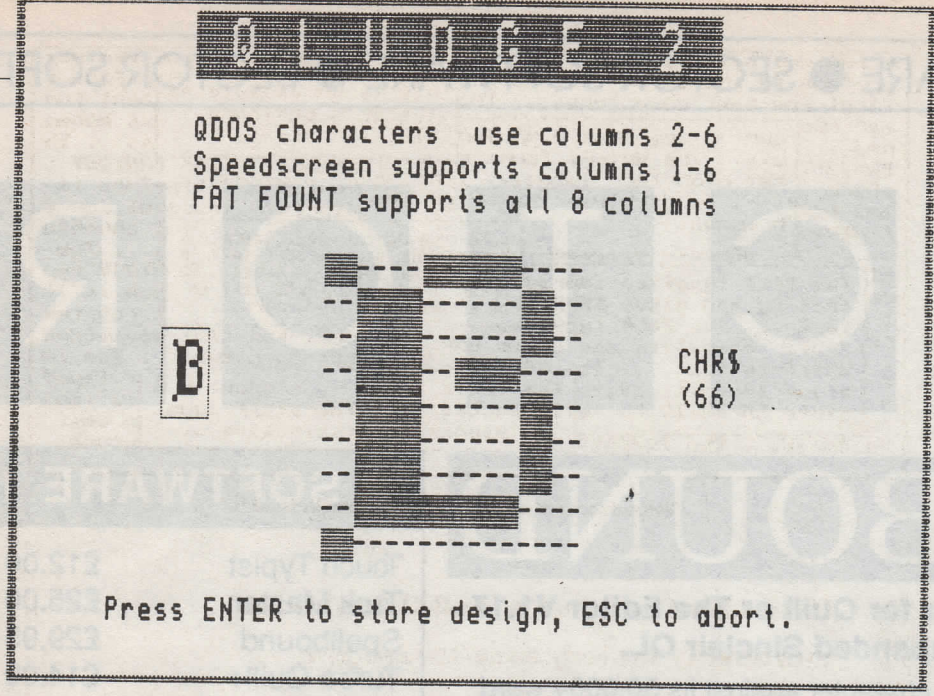
More usefully, the QL can now display conventional 8 × 8 fonts and its Mode 4 characters can be replaced by something more legible to TV users. The SpeedScreen package includes a variety of new fonts and an advanced character designer similar to the QLUDGE utility bundled with Turbo Toolkit. It is reasonably easy to use and the extra pixels certainly allowed the imagination more scope but the manic flashing cursor became irritating and users may prefer to write their own character designer.

Despite its power, SpeedScreen is not a cure-all and it is not without its quirks. Mode 8 printing, most of the stipple patterns and all of the graphics commands are unaffected by it, although no restrictions are imposed on their use alongside accelerated characters. Underlining in non-standard character widths is disjointed but the cure would slow SpeedScreen too much to make the fix worthwhile.

Improvement

Active windows and borders are not re-drawn following mode changes but this is more of an improvement than a quirk. A few minor niggles tend to creep in when more advanced SpeedScreen features are used but they would be met only by programmers well able to cope with them.

Some programs benefit more than others from the SpeedScreen environment, due more to the way they were written than to any limitations of SpeedScreen. Quill and Abacus, not noted for the priority they place on screen updating, are greatly improved; page re-drawing is much less pedestrian, operations like COPY and ERASE work quickly and the Quill over-write mode becomes almost as fast as insert mode. Keeping SpeedScreen compatible with all other software has been an uphill struggle but Creative CodeWorks believes that the vast majority of possi-



"... a handful of fonts complete the package."

friendly

ble clashes have been identified and averted. A minor but unavoidable quirk is that SpeedScreen must be loaded before QRAM.

The SuperBasic editing environment is more responsive because of the speed with which Window#2 is updated. Most impressive, though, is the way screenfuls of more than 1,000 characters can be printed almost instantaneously. SpeedScreen puts the QL into the same class as the BBC Micro for screen printing. For readers unfamiliar with the BBC, SpeedScreen literally has to be seen to be believed.

When developing SpeedScreen, the main target for Goodwin's attention was the slothful Qdos printing routine which handles all screen text, no matter what CSIZEs, character designs, window shapes, border thicknesses and colour combinations are used. Its sluggishness is due to its generality; therefore the obvious cure was to trade compactness for speed and replace it with no fewer than 22 smaller routines, each handling specific printing options. The characters printed most frequently are spaces, so SpeedScreen includes a dedicated super-fast routine for printing spaces.

SpeedScreen handles each line of print as an entity, calculating all the character positions before printing starts. The Qdos code, on the other hand, is forced by its ubiquity to calculate each character position individually. Even though SpeedScreen has to choose the most appropriate of its 22 routines and carry-out a series of preparatory calculations, it is still faster off the mark than the QL native printing routine. When printing begins the speed increase is phenomenal.

The fastest SpeedScreen routine works with white ink on black paper. Slightly slower routines cope with other colours and with the vertically-striped stipples. Because other stipples involve repeated changes to the printing masks they are passed to the ROM printing routine but SpeedScreen handles all UNDER and OVER options.

The calculations for locating CSIZE 1,0 characters are greatly simplified because their eight-pixel width exactly fits two bytes of the screen map. This is especially advantageous when characters begin on a word boundary in the RAM screen image. Under those conditions, even Qdos manages to improve its printing rate by some 29 percent but SpeedScreen offers an incredible 1,200 percent increase compared to the Qdos code printing "off-grid".

Representative timings are like car performance figures, that is their relevance is limited. Anyone expecting Quill to run 12 times faster, for instance, probably thinks an Austin Metro will return 75 miles per gallon on shopping trips. Without making special arrangements to take advantage of the fastest SpeedScreen options, users can expect printing to be around four times faster on unexpanded QLs and six times faster if a memory expansion is fitted or the EPROM version of SpeedScreen is used. Carefully-chosen window positions, CSIZEs and colour options will ensure the twelvefold speed increase promised by Creative Codeworks.

Simple living

Living with SpeedScreen is simple even for QL owners who know nothing about SuperBasic because it has been designed to be unobtrusive and completely compatible with everything else which runs on a QL. It can be installed as an extension alongside toolkits, front-ends and the like and then forgotten unless users wish to take advantage of the extra fonts, character sizes and scrolling options. It is very easy to take SpeedScreen for granted but omitting it accidentally from the boot sequence offers a painful reminder of what the QL used to be.

The SpeedScreen package contains a group of nine variants of the Basic code which occupy between 4.5K and 16K of memory space. Options include cut-down versions for unexpanded QLs and an extended variant to cope with very wide fonts. A comprehensive handbook, a configuration utility, a character designer and a handful of fonts complete the package.

SpeedScreen does everything Creative CodeWorks claims it does and it is practically vice-free. The package is well-thought-out, thoroughly tested, easy-to-use and sensibly priced. It has the advantage of enhancing almost every piece of software available and it does so without imposing restrictions and without requiring any computer literacy from the user. Goodwin is promising something else fast and friendly after the New Year but he may find that meeting the demand for SpeedScreen will be diverting his attention for some time.

Product: SpeedScreen
From: Creative CodeWorks,
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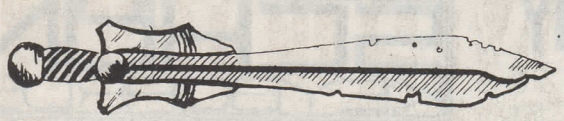

the talisman – is the new role simulation from PCBS.

Your quest is to discover the Talisman – a small golden periapt which protects its wearer from physical and supernatural damage and lies within an underground complex inhabited by a myriad of terrible adversaries.

The Talisman is not a conventional adventure game nor an arcade game; but a combination of both, with elements of strategy and realism. It is unique since the combination is randomly generated each time the game is played – resulting in the unusual situation where the game's author can play it too – incidentally he has yet to find the Talisman !

Throughout the quest you could be confronted by over one hundred different types of creatures – and use over one hundred different magical aids. This, coupled with the intricate game system and random generation facility, means that it can only be played on expanded machines. The game comes with a comprehensive manual detailing magical items, creatures and information on the four character types available.

Finally we must warn you that this game is completely addictive; our playtesters have indulged in all night sessions, only stopping for calls of nature !

No–one has finished the game yet – will you be the first ?

The Talisman is THOR compatible, and is available in 3.5 inch disc or on two micro–drives – priced £19.00

ATTENTION ALL QL ADVENTURERS! CAN YOU BECOME THE HERO OF THE 'PRINCELANDS'

IN THE ENTHRALLING NEW EPIC

THE HEART OF GERN ?

© 1987

The "Heart of Gern" is the first of a challenging series of adventure games devised to test even the most battle scarred adventurer. Set in the magical fantasy world of the 'Princelands' you Tirac must continue the quest for the black jewel which imprisons the evil spirit-wolf, Gern. You must reach the Heart before the brotherhood, an evil cult of wolf worshippers whose aim is to release Gern. Hidden away in a secret vault protected by guards, traps and magical deceptions it will take more than luck to succeed, it will take skill, determination and above all rational thinking.

Will this be the dawn of a new dark age or can the evil brotherhood be thwarted ! The fate of the 'Princelands is in your hands.

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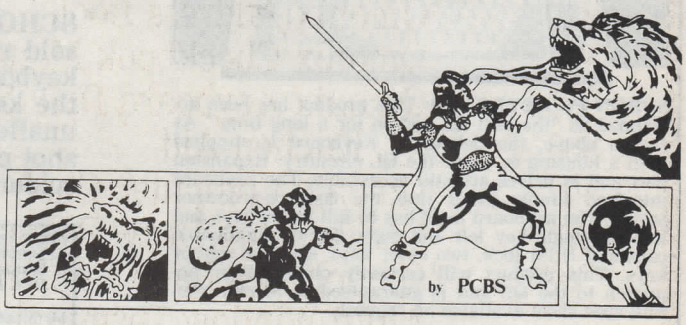
(Please specify format required) 3½" Disc Mode 4 or 8 @ £17.00



Send your cheques, P/O to: PCBS, Studio 204, Seedhill Offices, Paisley PA1 1JN. Please allow 14 days for delivery.

QL TURBOQUIL +

QL Turboquill described as 'absolutely essential' by QL World now has a new even faster version, QL Turboquill+ for expanded memory QL's only. TQ+ drastically improves screen handling by over 100%, this plus the added features of a glossary (keydefine) and capslock indicator turns quill into a slick, fast professional word processor. QL TURBOQUILL+ now compatible with QRAM.

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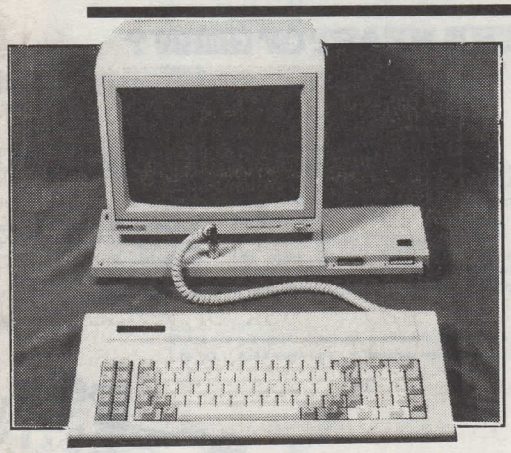
THE PERFECT PRESENT FOR ANY QL — OR EVEN ITS OWNER

SCHÖN KEYBOARDS

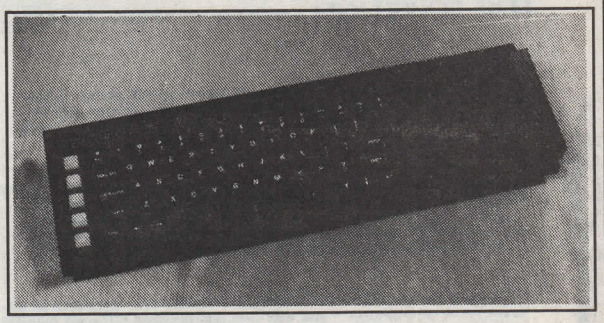


SCHON PC KEYBOARD: This product has been acclaimed as "the best QL add-on for a long time." As shown above, the Schon PC Keyboard is supplied with a housing to cover the QL circuitry. Expansion port and M drives are still accessable. The keyboard interface simply plugs into the 8049 co-processor socket. The keyboard itself has 86 full travel keys and include single key left and right delete, illuminated caps and NUM lock, two enter keys, diagonal cursor keys. This product will certainly change your approach to the QL and is guaranteed to benefit you. Full spec sheet available on request.

SCHÖN KEYBOARDS **NORTHCOTE CRESCENT, WEST HORSLEY, SURREY KT24 6LX (04865) 3836**

Please allow 28 days for delivery. Trade enquiries welcome

ZX MICROFAIR



SCHON STANDARD REPLACEMENT: The most widely sold replacement keyboard for the QL is the basic add-on keyboard. It makes no drastic changes to the QL other than the keys. Expansion port, rear ports and M drives remain unaffected. The 65 keys are all full travel and have two shot plastic symbols. To install – simple screwdriver job, no soldering – 5 minutes. Spec sheet available.

Please send me the following:
- ☐ **Schon PC Keyboard @ £99.95 inc VAT. £2.10 p&p**
- ☐ **Schon Standard QL Keyboard @ £54.95 inc VAT. £1.70 p&p**
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WDSoftware

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TO ALL QL READERS!

Welcome to our new FOCUS SALESPOINT where each month we intend to bring you up to date special offers on high quality products for your computer, your office and YOU at the best possible prices.

PRIZE IDEAS

This is YOUR Focus Salespoint, so if you have any ideas about the kind of product you would like to see offered on these pages please let us know! Just pop a note into the envelope with your order form. There's a special prize for the best idea!

QL GOLD MEMBERS

Keep a close watch. There will be something special for you starting THIS MONTH with a XMAS DRAW. ALL GOLD Members ordering from this month's coupon will be entered into a free draw. The winner will receive a bumper bundle of QL goodies worth £100! Don't forget to fill in your GOLD number. The competition closes 15th January and the winner's name will be published in the next available issue.

MERRY CHRISTMAS FROM ALL AT QL WORLD!

AT LAST! £6.50 THE QL SOFTWARE DIRECTORY FROM D.J.W.

In response to hundreds of enquiries from Britain and Overseas, there is now a definitive list of all the QL Software on the market and names and addresses of where you can buy it.

QL World, in conjunction with D.J.W. are offering this list on a microdrive containing quill files. There is also an update service available so that every so often you can send your old microdrive to D.J.W. and swop is for a brand new updated one. The price includes post & packing.

1.2 KEYBOARD CONTROLLER CHIP

Complete with full instructions, easy to fit, this little chip gets rid of the annoyance caused by "roll over effect" which means that when you accidentally touch an adjacent key, your target letter prints twice. If you have found this a problem in the past, then the keyboard controller chip is just what you need.

£7.50 (including post & packing)

STRESS FREE FROM A. M. T.

This month we bring you three handy attachments for your QL from A.M.T. All three have attributes in common. They are all simple and all designed to make life easier, which can't be bad!

THE THINGI (rrp £7.95) – creates working space out of thin air!

A scientifically designed copy holder which will take single sheets or bulky documents and is completely adjustable to suit your needs. The THINGI can improve accuracy and typing speed dramatically and virtually eliminates stiff necks and eye strain. Velcro fastenings make it easy to attach and remove and it virtually indestructible in normal use.

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TRIPLE-S (rrp £19.95) – stops your print-outs getting in a tangle!

A universal device that **STORES** listing paper, **SEPARATES** the incoming and outcoming paper, avoiding those annoying tangles, then **STACKS** the finished print-outs. Especially useful for long print runs which can be undertaken with the minimum of attention **TRIPLE-S** is a totally new invention made of sturdy 3mm perspex.

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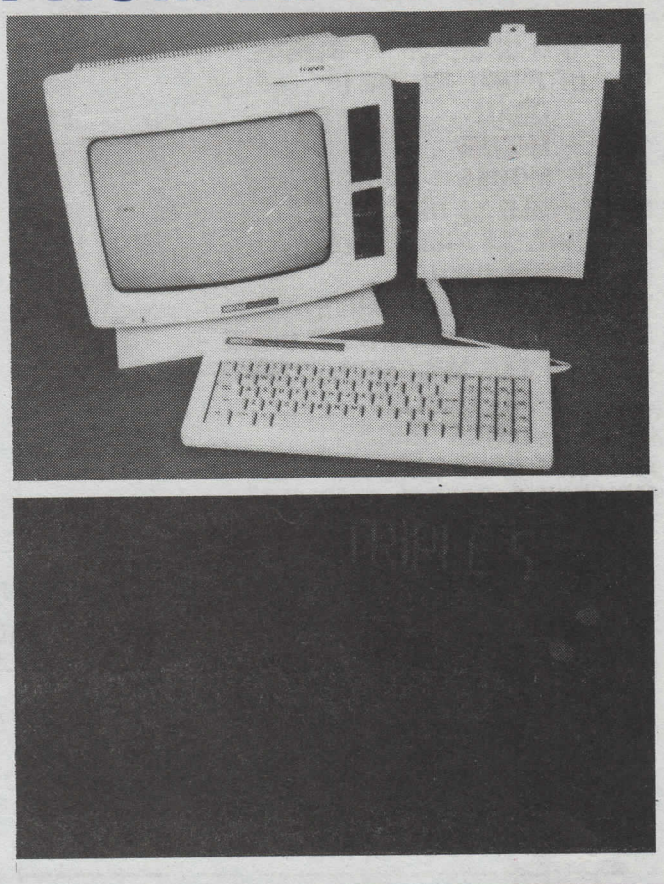
THE PLONKER BOX (rrp £4.99 – holds your working discs while not in use.

This little box will stick anywhere on your computer or wall and holds up to four discs at once so you don't have to scrabble around looking for them!

Special Readers' Price only £2.99.

OVERSEAS READERS ADD £1.00 extra for postage.



PDQL Combinations

Each of the following programs work beautifully together and we are offering readers a chance to buy any TWO at a special price.

PLUS XMAS SPECIAL - DOMINATION the ultimate in Strategy Games - an addictive test of your economic and military skills for up to four players any or all of whom can be the computer. Special Xmas price £9 including P&P.

COMPARE scans 2 files displayed one above the other and highlights all differences. The unique magic panel allows you to realign and continue.

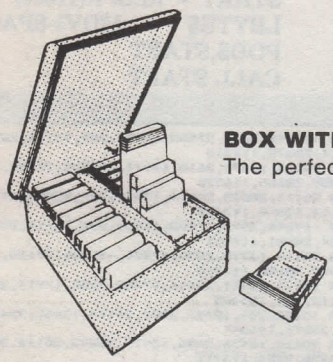
PDQL-COPY the most versatile copying program on the QL scene, provides instant reports to screen or printer on comparative sizes and copy dates from two discs or cartridges as well as other features.

X-REF is indispensable when writing large programs. Provides a full cross reference index of all keywords from your super-basic program and identifies problems caused by mis-typing, undefined assignment or unassigned definition.

COMPARE / COPY £15
COMPARE / X-REF £19
X-REF / COPY £21

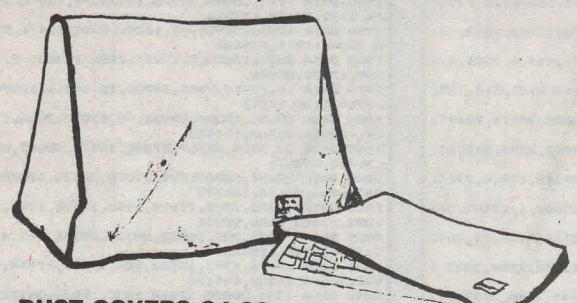
ALL PROGRAMS ARE THOR COMPATIBLE.

QL X-MAS OFFERS



BOX WITH TEN CARTRIDGES £20.
The perfect Xmas Box for QL owners!

GOLDEN OLDIES £10
A compilation of QL games for fun over Xmas. Three games – Meteor Storm, QL Caverns and Diffusion which normally will cost you £24.95.



DUST COVERS £4.60
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THE P·R·O·G·S

If you have a program that is worthy of consideration, send it to 'The Progs', Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG. We pay for everything published at the usual page rates — £80 per thousand words.

Program of the month

SPACE PODS by SIMON QUINN

You have been put in charge to protect six fuel pods situated in the centre of the screen. Enemy ships will try to steal the pods and you must stop them by destroying them. The ships take two hits to destroy but ramming them will kill them, as well as killing yourself.

An energy field surrounds the pods to protect them and you will bounce off it, so be careful. The game ends when either all your fuel pods have been stolen or you have run out of lives.

To rotate the ship use the left and right arrow keys; to thrust forward use the up arrow key; to stop the ship use the down arrow key and to fire use the space bar. To play the game, type and run the Basic Loader listing. Then, to play the game, type:

```
START = RESPR(11600)
LBYTES MDV1-SPACE-PODS,START
CALL START
```

```
60 REMark ******************************
70 REMark ******* BASIC LOADER *********
80 REMark *** WRITTEN BY SIMON QUINN ***
90 REMark ******************************

100 CLS
110 RESTORE
120 start=RESPR(11550)
140 add=0
150 FOR a=1000 TO 6760 STEP 10
160 total=0
180 FOR x=1 TO 10
185 READ d
190 POKE_W start+add,d
200 total=total+d
210 add=add+2
220 NEXT x
230 READ check:IF check<>total THEN PRINT "ERROR I
N LINE:";a:STOP
240 NEXT a
250 SBYTES mdv1_spacepods,start,11600
1000 DATA 17914,3978,16978,28688,29184,29696,20033
,28711,29184,8316,212682
1010 DATA 1,1,30463,20035,5116,2,1,-32669,28685,29
184,80819
1020 DATA 29696,17402,4136,20035,28704,20035,28685
,29184,29696,17402,224975
1030 DATA 4136,20035,28716,29185,20035,28713,29186
,20035,28717,29187,237945
1040 DATA 29697,20035,10876,0,0,31232,30727,19450,
148,18938,161103
1050 DATA 304,12828,-11707,13340,-27579,30463,2869
5,20035,13432,208,80019
1060 DATA 8781,20114,-9220,0,20,20940,-30,20997,30
77,4,64683
1070 DATA 27598,28713,29191,20035,21317,30727,1945
0,90,18938,246,196305
1080 DATA 12828,-11707,13340,-27579,30463,28695,20
035,13432,208,8781,88496
1090 DATA 20114,-9220,0,20,20940,-30,28713,29188,2
0035,28717,138477
1100 DATA 29186,29696,20035,28716,29184,20035,2918
4,28711,20035,5116,239898
1110 DATA 5,1,-32669,24832,4504,3073,64,26358,2483
2,216,51216
1120 DATA 24576,-228,10,21328,16707,17696,20559,17
491,0,0,118139
1130 DATA 0,0,10,24415,24415,24415,24415,24415,0,0
,122085
1140 DATA 0,0,10,17231,20052,21071,19539,8250,0,0,
86153
1150 DATA 0,0,15,-17219,8224,21071,21569,21573,827
5,18505,82013
1160 DATA 20480,0,10,-16864,8224,21576,21077,21332
,0,0,75835
1170 DATA 0,0,18,-16608,8224,21061,22085,21075,176
96,21576,95127
1180 DATA 21077,21332,10,21328,16707,17696,17993,2
1061,0,0,137204
1190 DATA 0,0,18,18505,21536,21328,16707,17696,215
83,8275,125648
1200 DATA 21569,21076,140,10,140,20,60,50,100,80,4
3245
1210 DATA 100,110,100,140,70,170,90,210,19529,2208
5,42604
1220 DATA 21320,18771,17231,21061,21315,20306,1766
4,17914,3516,13500,172598
1230 DATA 3,17914,3510,16978,17914,3506,17042,2918
4,30463,8316,144830
1240 DATA 1,1,28711,20035,28685,29184,29696,17402,
3684,20035,177434
1250 DATA 28704,20035,28685,29191,29697,17402,3676
,20035,28712,29184,235321
1260 DATA 20035,28695,29194,29698,20035,28679,2970
1,17402,-100,20035,223374
1270 DATA 28695,12860,130,29698,20035,28679,29703,
17402,-115,20035,187122
1280 DATA 28695,12860,320,29698,20035,28679,29701,
17402,-128,20035,187297
1290 DATA 28695,12860,225,29698,20035,13432,206,12
858,3384,20114,141507
1300 DATA 28695,29269,29698,20035,13432,206,12858,
3358,20114,29184,186849
1310 DATA 29696,30208,30720,31232,31744,32256,1285
7,2,-32722,-32004,133989
1320 DATA 200,3137,360,27382,17914,3362,13441,2918
4,17914,3342,116236
1330 DATA 9404,100,100,17914,3324,13500,9,17914,33
18,13500,79083
1340 DATA 2,17914,3312,16978,17914,3308,16978,1791
4,3308,17042,114670
1350 DATA 17914,3306,17042,17914,3342,13500,220,-2
5138,32256,17402,97758
1360 DATA 4004,18938,3900,18426,3103,13432,286,201
14,18938,3670,104811
1370 DATA 18426,3098,13432,286,20114,18426,3088,18
938,3760,20114,119682
1380 DATA 28688,17914,3288,16986,20936,-4,28688,17
914,3310,16986,154706
1390 DATA 20936,-4,17914,3266,13692,30,28,17914,32
90,13692,90758
1400 DATA 100,28,17914,3350,13500,240,13692,110,2,
13692,62628
1410 DATA 256,4,13692,110,6,13692,272,8,13692,110,
41842
1420 DATA 10,13692,240,12,13692,100,14,13692,256,1
6,41724
1430 DATA 13692,100,18,13692,272,20,13692,100,22,2
8683,70291
1440 DATA 18426,3250,14042,20936,-4,17914,3228,286
77,13564,1,120034
1450 DATA 20936,-6,17914,3226,13692,150,2,13692,13
0,6,69742
1460 DATA 13692,140,10,13692,50,14,13692,60,18,136
92,55060
1470 DATA 70,22,17914,3044,13500,6,12858,3036,1900
9,26368,95827
1480 DATA 2630,12858,3008,19009,26368,2620,17914,3
038,22610,3154,113209
1490 DATA 360,27394,16978,17914,3026,21074,3154,20
0,27394,16978,134472
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1510 DATA 2982,13882,2968,24832,3072,12858,2976,13
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1520 DATA 24832,3780,18938,3578,17914,2946,3154,1,
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1530 DATA 2944,13370,2942,30215,24832,3752,24832,3
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1540 DATA 2,3074,2,26128,17914,2902,21330,3154,-1,
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1550 DATA 13500,35,5121,514,16,3074,16,26126,17914
,2874,69190
1560 DATA 21074,3154,36,26114,16978,17402,3592,131
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1570 DATA 286,18426,2761,20114,5121,514,4,3074,4,2
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1580 DATA 13432,286,18426,2748,20114,5121,514,128,
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1590 DATA 26134,13432,284,16993,28680,20114,28694,
20114,28875,20114,203434
1600 DATA 28881,20114,17914,2802,9402,2794,513,64,
3073,64,85621
1610 DATA 26156,17914,2750,19026,26148,17914,2764,
19026,26112,28,157838
1620 DATA 28689,18426,2976,20033,13500,1,17402,347
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1630 DATA 18426,2665,20114,12858,2730,3137,15,2612
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1640 DATA 16978,17914,2714,16978,12858,2706,3073,1
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1650 DATA 286,18426,2592,20114,17914,2688,21074,13
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1660 DATA 20114,28674,20114,18426,2676,13977,28922
,20114,28674,20114,201805
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1750 DATA 20114,18426,2496,13977,28892,20114,28674
,20114,18426,2484,173717
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1770 DATA 13116,35,28680,20114,28887,20114,3152,47
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1790 DATA 10,27152,12476,10,13116,10,28680,20114,2
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1800 DATA 3152,220,27408,12412,220,13116,220,28680
,20114,28893,134435
1810 DATA 20114,16890,2376,13432,284,3152,220,2749
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1820 DATA 27232,16890,2358,3152,85,27478,3152,127,
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1830 DATA 2576,28689,20033,16890,2332,3152,256,271
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1840 DATA 28680,20114,28875,20114,24588,13116,1,28
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1850 DATA 20114,16890,2298,3152,105,27150,13116,-1
,28680,20114,131618
1860 DATA 28881,20114,24588,13116,1,28680,20114,28
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1870 DATA 2392,17402,2376,18426,2408,21643,21642,2
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1880 DATA 22666,22667,20936,-10,24614,3153,1,26142
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1890 DATA 26374,27914,21074,24584,12988,2,24588,21
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1900 DATA 13330,24832,2938,20085,17402,2914,16890,
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1910 DATA 28688,12506,20936,-4,16890,2220,12476,10
,18938,2570,115230
1920 DATA 17914,2140,13500,-2,17914,2134,13500,12,
17914,2128,87154
1930 DATA 16978,17914,2124,13500,-15,24832,164,168
90,2140,17914,112441
1940 DATA 2172,28688,13528,20936,-4,16890,2124,179
14,2190,28688,133126
1950 DATA 12506,20936,-4,16890,2142,12476,220,1893
8,2600,17914,104618
1960 DATA 2062,13500,2,17914,2056,13500,-2,17914,2
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1970 DATA 10,17914,2044,13500,15,24916,16890,2062,
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1980 DATA 28688,13528,20936,-4,12858,2006,17914,20
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1990 DATA 52,3154,32767,27394,16978,28695,8316,1,1
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2000 DATA 29184,12860,390,29698,20035,12858,1966,1
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2010 DATA 17402,2702,17914,1950,13498,1948,24576,-
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2020 DATA 13432,284,28832,20114,28676,20114,12825,
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2030 DATA 18426,1793,13432,286,20114,17914,1974,19
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2040 DATA 1334,20085,17914,1930,19026,26112,270,16
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2080 DATA 18426,1866,14012,2,18426,1860,16979,1343
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2090 DATA 1832,28680,20114,28910,20114,28682,20114
,28881,20114,13114,210555
2100 DATA 1850,28680,20114,28887,20114,13432,284,1
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2110 DATA 1828,-7350,-10558,13075,28680,20114,2888
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2120 DATA 13355,2,-11142,1742,13058,28680,20114,13
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2130 DATA 1600,20114,17914,1756,13465,19026,27140,
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2140 DATA 284,28886,20114,28674,20114,12825,16890,
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2170 DATA 20114,28893,20114,17914,1674,1106,18,190
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2220 DATA 12858,1592,13370,1590,30215,24832,2370,1
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2230 DATA 1574,17914,1568,3154,15,27406,16978,1791
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,17914,1506,78573
2260 DATA 19026,26414,17914,1500,19026,26150,12858
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2270 DATA 13882,1446,17475,-11197,13882,1498,-7349
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2280 DATA 12288,13698,12290,24832,2174,17402,2152,
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,16890,1340,12441,159124
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2420 DATA 13370,1178,14394,1142,17476,-11196,13884
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,-19846,3253
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2910 DATA 20085,18241,19781,8271,22085,21182,-1030
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2920 DATA -25891,-25885,-25903,-25897,-25909,-2591
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2930 DATA -10740,4132,5654,6877,6371,-1520,512,-12
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2940 DATA -10526,-24562,2775,214,-13814,-10276,-12
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2960 DATA -21350,3792,2769,214,-2596,-1102,-23026,
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2970 DATA 2220,3606,6834,3604,-24562,-16616,-19954
,5280,3769,-12085,-47904
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,0,0,-74137
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3020 DATA 0,0,0,0,0,0,0,0,0,0
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-14862
3150 DATA 2047,25600,0,0,0,0,2047,25600,0,2039,573
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3160 DATA 4096,0,2043,18301,6793,2051,20480,0,0,0,
53764
3170 DATA 0,0,0,0,0,0,0,0,0,0
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3190 DATA 0,0,2056,28160,0,2055,26880,0,2051,20480
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3210 DATA 2047,25600,0,2039,4096,0,2043,18301,6793
,2051,62970
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3230 DATA 0,0,0,0,0,0,0,0,0,0
3240 DATA 0,0,0,0,0,0,2056,28160,0,2055,32271
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3310 DATA 0,0,0,0,0,0,0,0,0,0
3320 DATA 0,0,0,0,0,0,0,0,0,0
3330 DATA 0,0,0,0,0,0,0,0,0,0
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3460 DATA 14337,-6583,-7351,-4278,-11199,-6839,-26
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3520 DATA 0,0,0,0,0,0,0,0,0,0
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3550 DATA -32768,62,16384,97,-16384,0,16384,0,0,0,
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3590 DATA -32768,254,-32768,1,-32768,0,-32768,0,0,
0,-130817

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3780 DATA 0,0,0,255,-2048,96,12288,16,-16384,17,-5
760
3790 DATA 0,38,0,40,0,48,0,0,0,0,126
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08
3830 DATA -32768,30,0,48,0,32,0,0,0,0,-32658
3840 DATA 0,0,0,0,0,0,0,0,0,0
3850 DATA 0,0,0,0,0,0,0,0,0,0
3860 DATA 0,96,0,62,0,33,-8192,16,7168,32,-785
3870 DATA -4096,47,0,112,0,0,0,0,0,0,-3937
3880 DATA 0,0,0,0,0,0,0,0,0,0
3890 DATA 0,0,0,0,0,0,0,0,48,48
3900 DATA 0,44,0,19,0,16,-8192,32,4096,64,-3921
3910 DATA 30720,255,-32768,0,0,0,0,0,0,0,-1793
3920 DATA 0,0,0,0,0,0,0,0,0,0
3930 DATA 0,0,0,0,0,0,32,0,56,88
3940 DATA 0,22,0,17,0,16,-16384,96,8192,255,-7786
3950 DATA -2048,0,0,0,0,0,0,0,0,0,-2048
3960 DATA 0,0,0,0,0,0,0,0,0,0
3970 DATA 0,0,0,0,0,0,0,8,0,20,28
3980 DATA 0,18,0,17,0,16,-16384,224,8192,511,-7406
3990 DATA -28672,0,30720,0,0,0,0,0,0,2048
4000 DATA 0,0,0,0,0,0,0,0,0,0
4010 DATA 0,0,0,0,0,0,0,4,0,6,10
4020 DATA 0,9,0,9,0,112,-32768,448,16384,60,-15746
4030 DATA 8192,3,-8192,0,12288,0,0,0,0,0,12291
4040 DATA 0,0,0,0,0,0,0,0,0,0
4050 DATA 0,0,0,0,0,0,0,2,0,6,8
4060 DATA 0,5,0,25,0,480,-32768,192,-32768,56,-647
78

4070 DATA 16384,6,16384,1,-24576,0,24576,0,0,0,327
75
4080 DATA 0,0,0,0,0,0,0,0,0,0
4090 DATA 0,0,0,0,0,0,0,1,0,3,4
4100 DATA 0,5,0,248,-32768,64,-32768,48,-32768,8,-
97931
4110 DATA -32768,6,16384,1,-16384,0,16384,0,0,0,-1
6377
4120 DATA 0,0,0,0,0,0,0,0,0,0
4130 DATA 0,0,0,0,0,0,0,0,-32768,1,-32767
4140 DATA -32768,250,-32768,68,-32768,32,-32768,24
,-32768,4,-163462
4150 DATA -32768,2,-32768,1,-32768,0,-32768,0,0,0,
-131069
4160 DATA 0,0,0,0,0,0,0,0,0,0
4170 DATA 0,0,0,0,0,0,0,0,16384,0,16384
4180 DATA -16384,115,16384,44,-32768,32,-32768,16,
-32768,8,-98089
4190 DATA -32768,5,0,5,0,3,0,1,0,0,-32754
4200 DATA 0,0,0,0,0,0,0,0,0,0
4210 DATA 0,0,0,0,0,0,0,0,48,48
4220 DATA 8192,44,-8192,19,16384,16,16384,8,-32768
,8,95
4230 DATA -32768,5,0,5,0,2,0,2,0,0,-32754
4240 DATA 0,0,0,0,0,0,0,0,0,0
4250 DATA 0,0,0,0,0,0,0,32,0,24,56
4260 DATA 0,20,28672,19,-24576,8,16384,8,16384,8,3
6927
4270 DATA -32768,9,0,6,0,6,0,4,0,0,-32743
4280 DATA 0,0,0,0,0,0,0,0,0,0
4290 DATA 0,0,0,0,0,0,0,8,0,12,20
4300 DATA 0,10,2048,9,-4096,8,8192,8,16384,9,20572
4310 DATA -32768,10,0,12,0,8,0,0,0,0,-32738
4320 DATA 0,0,0,0,0,0,0,0,0,0
4330 DATA 0,0,0,0,0,0,0,4,0,10,14
4340 DATA 0,9,0,17,-2048,16,12288,16,-16384,17,-60
69
4350 DATA 0,38,0,40,0,48,0,0,0,126
4360 DATA 0,0,0,0,0,0,0,0,0,0
4370 DATA 0,0,0,0,0,0,0,2,0,3,5
4380 DATA 0,5,0,4,-4096,8,6144,8,24576,17,26666
4390 DATA -32768,30,0,48,0,32,0,0,0,0,-32658
4400 DATA 0,0,0,0,0,0,0,0,0,0
4410 DATA 0,0,0,0,0,0,0,1,0,3,4
4420 DATA 0,2,-32768,4,-16384,8,14336,16,3072,16,-
31698
4430 DATA -4096,47,0,112,0,0,0,0,0,0,-3937
4440 DATA 0,0,0,0,0,0,0,0,0,0
4450 DATA 0,0,0,0,0,0,0,0,-32768,1,-32767
4460 DATA -32768,2,-32768,12,-32768,16,-16384,32,1
2288,64,-102274
4470 DATA 30720,255,-32768,0,0,0,0,0,0,0,-1793
4480 DATA 0,0,0,0,0,0,0,0,0,0
4490 DATA 0,0,0,0,0,0,0,0,16384,0,16384
4500 DATA -16384,3,16384,4,-32768,24,-32768,96,245
76,255,-40578
4510 DATA -2048,0,0,0,0,0,0,0,0,0,-2048
4520 DATA 0,0,0,0,0,0,0,0,0,0
4530 DATA 0,0,0,0,0,0,0,0,0,0
4540 DATA 8192,0,-8192,7,16384,24,16384,224,8192,5
11,41726
4550 DATA -28672,0,30720,0,0,0,0,0,0,2048
4560 DATA 0,0,0,0,0,0,0,0,0,0
4570 DATA 0,0,0,0,0,0,0,0,0,0
4580 DATA 0,0,28672,7,-24576,120,8192,448,16384,60
,29307
4590 DATA 8192,3,-8192,0,12288,0,0,0,0,0,12291
4600 DATA 0,0,0,0,0,0,0,0,0,0
4610 DATA 0,0,0,0,0,0,0,0,0,0
4620 DATA 0,0,6144,31,-4096,480,8192,192,16384,56,
27383
4630 DATA 16384,6,8192,1,-24576,0,24576,0,0,0,2458
3
4640 DATA 0,0,0,0,0,0,0,0,0,0
4650 DATA 0,0,0,0,0,0,0,0,0,0
4660 DATA 0,0,0,255,-2048,64,12288,48,-16384,8,-57
69
4670 DATA -32768,6,-32768,1,-16384,0,16384,0,0,0,-
65529
4680 DATA 0,0,0,0,0,0,0,0,0,0
4690 DATA 0,0,0,0,0,0,0,0,0,0
4700 DATA 0,240,0,79,-4096,32,6144,24,24576,4,2700
3
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PROGS

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4710 DATA -32768,2,-32768,1,-32768,0,-32768,0,0,0,
-131069
4720 DATA 0,0,0,0,0,0,0,0,0,0
4730 DATA 0,0,0,0,0,0,0,0,0,0
4740 DATA 0,96,0,62,0,33,-8192,16,7168,8,-809
4750 DATA -4096,4,-32768,5,0,3,0,1,0,0,-36851
4760 DATA 0,0,0,0,0,0,0,0,0,0
4770 DATA 0,0,0,0,0,0,0,0,48,48
4780 DATA 0,44,0,19,0,16,-8192,8,4096,8,-4001
4790 DATA -2048,5,0,5,0,2,0,2,0,0,-2034
4800 DATA 0,0,0,0,0,0,0,0,0,0
4810 DATA 0,0,0,0,0,0,0,32,0,24,56
4820 DATA 0,22,0,17,0,8,-16384,8,8192,8,-8129
4830 DATA -2048,9,0,6,0,4,0,4,0,0,-2025
4840 DATA 0,0,0,0,0,0,0,0,0,0
4850 DATA 0,0,0,0,0,0,0,8,0,12,20
4860 DATA 0,10,0,9,0,8,-16384,8,8192,8,-8149
4870 DATA 4096,9,-2048,10,0,12,0,0,0,0,2079
4880 DATA 0,0,0,0,0,0,0,0,0,0
4890 DATA 0,0,0,0,0,0,0,4,0,10,14
4900 DATA 0,9,0,17,0,16,-32768,16,16384,16,-16310
4910 DATA 8192,35,-24576,44,28672,48,0,0,0,0,12415
4920 DATA 0,0,0,0,0,0,0,0,0,0
4930 DATA 0,0,0,0,0,0,0,0,0,0
4940 DATA 0,0,0,0,0,0,0,0,0,0
4950 DATA 0,0,0,0,0,0,0,0,0,0
4960 DATA 0,0,0,0,0,0,0,0,0,0
4970 DATA 0,15,-8192,48,6144,192,1536,256,256,256,
511
4980 DATA 256,512,128,512,128,512,128,512,128,512,
3328
4990 DATA 128,512,128,256,256,192,1536,48,6144,15,
9215
5000 DATA -8192,0,0,0,0,0,0,0,0,-8192
5010 DATA 0,0,31,-4096,32,2048,192,1536,128,-129
5020 DATA 512,256,256,256,256,256,256,256,256,256,
2816
5030 DATA 256,128,512,64,1024,48,6144,15,-8192,0,-
1
5040 DATA 0,0,0,0,0,0,0,0,0,0
5050 DATA 0,0,0,0,0,7,-16384,24,12288,32,-4033
5060 DATA 2048,64,1024,128,512,128,512,128,512,128
,5184
5070 DATA 512,128,512,64,1024,48,6144,15,-8192,0,2
55
5080 DATA 0,0,0,0,0,0,0,0,0,0
5090 DATA 0,0,0,0,0,0,15,-8192,16,-8161
5100 DATA 4096,32,2048,64,1024,64,1024,64,1024,64,
9504
5110 DATA 1024,32,2048,24,12288,7,-16384,0,0,0,-96
1
5120 DATA 0,0,0,0,0,0,0,0,0,0
5130 DATA 0,0,0,0,0,0,1,0,14,15
5140 DATA -8192,16,4096,32,2048,32,2048,32,2048,32
,2192
5150 DATA 2048,24,12288,7,-16384,0,0,0,0,0,-2017
5160 DATA 0,0,0,0,0,0,0,0,0,0
5170 DATA 0,0,0,0,0,0,0,0,7,7
5180 DATA -16384,8,8192,16,4096,16,4096,16,4096,8,
4160
5190 DATA 8192,7,-16384,0,0,0,0,0,0,0,-8185
5200 DATA 0,0,0,0,0,0,0,0,0,0
5210 DATA 0,0,0,0,0,0,0,0,0,0
5220 DATA 0,7,-16384,8,8192,8,8192,4,16384,3,16414
5230 DATA -32768,0,0,0,0,0,0,0,0,0,-32768
5240 DATA 0,0,0,0,0,0,0,0,0,0
5250 DATA 0,0,0,0,0,0,0,0,0,0
5260 DATA 0,0,0,3,-32768,4,16384,4,16384,3,14
5270 DATA -32768,0,0,0,0,0,0,0,0,0,-32768
5280 DATA 0,0,0,0,0,0,0,0,0,0
5290 DATA 0,0,0,0,0,0,0,0,0,0
5300 DATA 0,0,0,0,0,1,-32768,3,0,0,-32764
5310 DATA 0,0,0,0,0,0,0,0,0,0
5320 DATA 0,0,0,0,0,0,0,0,0,0
5330 DATA 0,0,0,0,0,0,0,15,-20480,8,-2057
5340 DATA 2048,8,2048,8,2048,8,2048,8,2048,15,-2048,8,619
1
5350 DATA 2048,8,2048,8,2048,8,2048,8,0,0,8224
5360 DATA 0,0,0,0,0,0,0,0,0,0
5370 DATA 0,0,0,0,0,7,-32768,4,31744,4,-1009
5380 DATA 1024,8,1024,8,2048,15,-30720,8,30720,8,4
143
5390 DATA 2048,16,2048,16,4096,16,4096,0,4096,0,16
432
5400 DATA 0,0,0,0,0,0,0,0,0,0
5410 DATA 0,0,0,0,0,3,0,2,-4096,4,-4087
5420 DATA 3584,4,512,8,1024,12,1024,19,-14336,16,-
8133
5430 DATA 12288,32,4096,32,8192,0,8192,0,16384,0,4
9216
5440 DATA 0,0,0,0,0,0,0,0,0,0
5450 DATA 0,0,0,0,0,1,-16384,2,12288,2,-4091
5460 DATA 3072,4,512,12,1024,11,2048,16,-14336,16,
-7621
5470 DATA 12288,32,8192,64,8192,0,16384,0,-32768,0
,12384
5480 DATA 0,0,0,0,0,0,0,0,0,0
5490 DATA 0,0,0,0,0,0,16384,0,-20480,1,-4095
5500 DATA 3072,2,512,4,256,10,512,17,-31744,32,-27
327
5510 DATA 26624,64,4096,0,8192,0,16384,0,-32768,1,
22593
5520 DATA 0,0,0,0,0,0,0,0,0,0
5530 DATA 0,0,0,0,0,0,8192,0,12288,0,20480
5540 DATA -14336,3,1024,6,512,25,256,96,-31232,128
,-43518
5550 DATA 22528,0,8192,0,16384,1,-32768,2,0,0,1433
9
5560 DATA 0,0,0,0,0,0,0,0,0,0
5570 DATA 0,0,0,0,0,0,0,0,14336,0,14336
5580 DATA -15360,3,512,13,512,48,-32512,192,-32000
,0,-78592
5590 DATA 19456,0,12288,0,-16384,3,0,4,0,0,15367
5600 DATA 0,0,0,0,0,0,0,0,0,0
5610 DATA 0,0,0,0,0,0,0,0,3072,0,3072
5620 DATA -3072,3,512,61,512,192,-32512,0,-32512,0
,-66816
5630 DATA 17152,0,-1024,3,0,12,0,0,0,0,16143
5640 DATA 0,0,0,0,0,0,0,0,0,0
5650 DATA 0,0,0,0,0,0,0,0,0,0
5660 DATA 7680,7,-7680,121,512,1,256,1,256,0,1154
5670 DATA -32512,0,-28928,3,-4096,28,0,0,0,0,-6550
5
5680 DATA 0,0,0,0,0,0,0,0,0,0
5690 DATA 0,0,0,0,0,0,0,0,0,0
5700 DATA 0,127,-512,0,-32256,0,-32256,0,-32256,0,
-97153
5710 DATA -32256,0,-32256,63,-512,0,0,0,0,0,-64961
5720 DATA 0,0,0,0,0,0,0,0,0,0
5730 DATA 0,0,0,0,0,0,0,0,0,60,60
5740 DATA 0,3,-4096,0,-28928,0,-32512,0,-32512,1,-
98044
5750 DATA 512,1,-7680,63,7680,0,0,0,0,0,576
5760 DATA 0,0,0,0,0,0,0,0,0,0
5770 DATA 0,0,0,0,0,0,0,24,0,7,31
5780 DATA -32768,0,24576,0,-20480,1,256,1,256,114,
-32652
5790 DATA 512,15,512,0,-3072,0,3072,0,0,0,1039
5800 DATA 0,0,0,0,0,0,0,0,0,0
5810 DATA 0,0,0,0,0,0,0,12,0,3,15
5820 DATA 0,0,-4096,0,19456,0,-32256,96,-32512,25,
-49287
5830 DATA 512,6,1024,1,-31744,0,26624,0,6144,0,256
7
5840 DATA 0,0,0,0,0,0,0,0,0,0
5850 DATA 0,0,0,0,0,4,0,3,0,0,7
5860 DATA -16384,0,8192,0,24576,64,-26624,33,1536,
26,-8581
5870 DATA 256,4,512,3,1024,0,-14336,0,12288,0,-249
5880 DATA 0,0,0,0,0,0,0,0,0,0
5890 DATA 0,0,0,0,0,2,0,1,0,0,3
5900 DATA -32768,0,16384,64,12288,32,10240,16,-153
60,11,-9093
5910 DATA 512,6,256,1,1536,0,-26624,0,24576,0,263
5920 DATA 0,0,0,0,0,0,0,0,0,0
5930 DATA 0,0,0,0,0,0,-32768,0,16384,0,-16384
5940 DATA 8192,64,8192,32,12288,16,-14336,19,1024,
12,15503
5950 DATA 1024,2,512,2,1536,1,6144,0,-8192,0,1029
5960 DATA 0,0,0,0,0,0,0,0,0,0
5970 DATA 0,0,0,0,0,0,16384,0,16384,32,32800
5980 DATA 8192,32,8192,16,4096,16,12288,11,-12288,
12,20567
5990 DATA 2048,4,2048,4,1536,2,30720,3,-32768,0,35
97
6000 DATA 0,0,0,0,0,0,0,0,0,0
6010 DATA 0,0,0,0,0,0,8192,0,8192,16,16400
6020 DATA 8192,16,4096,8,4096,8,-2048,15,2048,8,16
439
6030 DATA 2048,8,1024,4,1024,4,15360,7,-16384,0,30
95
6040 DATA 0,0,0,0,0,0,0,0,0,0
6050 DATA 0,0,0,0,0,0,0,8,2048,8,2064
6060 DATA 2048,8,2048,8,2048,8,2048,15,-2048,8,619
1
6070 DATA 2048,8,2048,8,2048,8,2048,15,-2048,0,618
3
6080 DATA 0,0,0,0,0,0,0,0,0,0
6090 DATA 0,0,0,0,0,4,0,4,1024,4,1036
6100 DATA 1024,8,1024,8,2048,15,2048,8,-2048,8,414
3
6110 DATA 2048,16,2048,16,4096,30,4096,1,-8192,0,4
159
6120 DATA 0,0,0,0,0,0,0,0,0,0
6130 DATA 0,0,0,0,0,2,0,2,0,4,8
6140 DATA 512,4,512,8,1024,12,1024,19,-14336,16,-1
1205
6150 DATA 12288,32,4096,48,8192,15,8192,0,-16384,0
,16479
6160 DATA 0,0,0,0,0,0,0,0,0,0
6170 DATA 0,0,0,0,0,1,0,2,0,4,7
6180 DATA 0,4,512,12,1024,11,2048,16,-14336,16,-10
693
6190 DATA 12288,32,8192,88,16384,6,16384,1,-32768,
0,20607
6200 DATA 0,0,0,0,0,0,0,0,0,0
6210 DATA 0,0,0,0,0,0,16384,0,-32768,1,-16383
6220 DATA 0,2,0,4,256,11,512,16,-15360,32,-14527
6230 DATA 10240,64,4096,48,8192,12,16384,2,-32768,
1,6271
6240 DATA 0,0,0,0,0,0,0,0,0,0
6250 DATA 0,0,0,0,0,0,8192,0,16384,1,24577
6260 DATA -32768,2,0,4,0,26,256,97,1536,192,-30655
6270 DATA -26624,32,24576,16,-16384,11,0,4,0,0,-18
369
6280 DATA 0,0,0,0,0,0,0,0,0,0
6290 DATA 0,0,0,0,0,0,0,4096,0,24576,1,28673
6300 DATA -32768,2,0,13,0,48,-32768,192,-32000,64,
-97217
6310 DATA 19456,32,28672,33,-32768,22,0,8,0,0,1545
5
6320 DATA 0,0,0,0,0,0,0,0,0,0
6330 DATA 0,0,0,0,0,0,0,0,14336,0,14336
6340 DATA -16384,3,0,62,0,193,0,65,0,32,-16029
6350 DATA -32000,32,-1024,31,0,16,0,0,0,0,-32945
6360 DATA 0,0,0,0,0,0,0,0,0,0
6370 DATA 0,0,0,0,0,0,0,0,0,0
6380 DATA 15360,7,-16384,121,0,65,0,64,-32768,32,-
33503
6390 DATA -32768,32,-28928,39,-4096,24,0,0,0,0,-65
697
6400 DATA 0,0,0,0,0,0,0,0,0,0
6410 DATA 0,0,0,0,0,0,0,0,0,0
6420 DATA 0,127,-1024,64,-32768,64,-32768,64,-3276
8,64,-98945
6430 DATA -32768,64,-32768,127,-512,0,0,0,0,0,-658
57
6440 DATA 0,0,0,0,0,0,0,0,0,0
6450 DATA 0,0,0,0,0,0,0,0,0,60,60
6460 DATA 0,35,-512,32,-32768,32,-32768,65,0,65,-6
5819
6470 DATA 0,113,-8192,15,7680,0,0,0,0,0,-384
6480 DATA 0,0,0,0,0,0,0,0,0,0
6490 DATA 0,0,0,0,0,0,0,24,0,39,63
6500 DATA -32768,32,28672,64,19968,64,-32768,128,-
32768,249,-49127
6510 DATA 0,7,0,0,-4096,0,3072,0,0,0,-1017
6520 DATA 0,0,0,0,0,0,0,0,0,0
6530 DATA 0,0,0,0,0,0,0,12,0,19,31
6540 DATA 0,32,-4096,32,19456,64,-32256,224,-32768
,25,-49287
6550 DATA 0,6,0,1,-32768,0,24576,0,6144,0,-2041
6560 DATA 0,0,0,0,0,0,0,0,0,0
6570 DATA 0,0,0,0,0,4,0,11,0,16,31
6580 DATA -16384,32,8192,64,8192,128,22528,96,-317
44,25,-8871
6590 DATA 512,6,0,3,0,0,-16384,0,8192,0,-7671
6600 DATA 0,0,0,0,0,0,0,0,0,0
6610 DATA 0,0,0,0,0,2,0,3,0,12,17
6620 DATA -32768,48,16384,64,12288,32,26624,17,-31
744,10,-9045
6630 DATA 512,6,0,1,0,0,-32768,0,16384,0,-15865
6640 DATA 0,0,0,0,0,0,0,0,0,0
6650 DATA 0,0,0,0,0,1,-32768,6,16384,24,-16353
6660 DATA 8192,96,8192,32,12288,32,-14336,19,2048,
12,16575
6670 DATA 1024,2,512,2,0,1,0,0,-32768,0,-31227
6680 DATA 0,0,0,0,0,0,0,0,0,0
6690 DATA 0,0,0,0,0,0,-16384,15,16384,48,63
6700 DATA 8192,32,8192,16,4096,16,12288,11,-12288,
12,20567
6710 DATA 2048,4,2048,4,1024,2,0,2,0,0,5132
6720 DATA 0,0,0,0,0,0,0,0,0,0
6730 DATA 0,0,0,0,0,1,-8192,30,8192,16,47
6740 DATA 8192,16,4096,8,4096,8,30720,15,-30720,8,
16439
6750 DATA 2048,8,1024,4,1024,4,1024,4,0,0,5140
6760 DATA 0,0,0,0,0,0,0,4,6,-30720,-30710
```

CHARACTER WRITE by MICHAEL WHEELER

Character Write is a small routine which allows the user to produce characters of any size and colour at any angle anywhere on the screen.

The *Character Write* routine, z, is a SuperBasic procedure designed to be merged with an existing program. The procedure requires six parameters – z, a$, b, c, d, x, y, where:

a$ – The character to be displayed.

b – The size of the character.

c – The angle at which it is to be drawn – in radians.

d – The colour.

x – x co-ord of the top left of the character.

y – y co-ord of the top left of the character.

The routine works by the use of some elementary trigonometry, the coloured blocks can be rotated and drawn at any angle. To run the demonstration, type-in and run the entire listing. To use Character Write in your programs, only the procedure 'z' is necessary – lines 1000 onwards.

```
100 REMark --- Demo of Character Write Routine ---
110 REMark ---            By M.J.Wheeler          ---
120 MODE 4
130 WINDOW 512,256,0,0
140 PAPER 0
150 CLS
160 REMark
170 LET String$="SINCLAIR"
180 FOR Loop=1 TO 8
190 z String$(Loop),4,0,7,0+Loop*54,5
200 END FOR Loop
210 REMark
220 BLOCK 407,150,54,37,2
230 LET String$="QL"
240 FOR Loop=1 TO 2
250 z String$(Loop),17,0,7,0+Loop*128,53
260 END FOR Loop
270 REMark
280 BLOCK 407,60,54,190,4
290 LET String$="WORLD"
300 FOR Loop=1 TO 5
310 z String$(Loop),5,0,7,0+Loop*79,203
320 END FOR Loop
330 REMark
340 LET String$="The definitive QL magazine!"
350 LET x0=RND(100 TO 412)
360 LET y0=RND(70 TO 150)
370 FOR Loop=1 TO 27
380 LET Angle=RAD(Loop*(360/(LEN(String$)+1))-(90+
360/(LEN(String$)+1)))
390 LET x=x0+30*SIN(Angle)
400 LET y=y0+30*COS(Angle)
410 z String$(Loop),1.5,-Angle,0,x,y
420 END FOR Loop
430 STOP
1000 REMark --- Character Write Routine ---
1010 DEFine PROCedure z (a$,b,c,d,x,y)
1020 LET e=PEEK_L(167722)+10+(CODE(a$)-32)*9
1030 LET f=b*COS(c)
1040 LET g=2*b*SIN(c)
1050 FOR Loop0=0 TO 8
1060 LET h=PEEK(e+Loop0+1)
1070 FOR Loop1=0 TO 7
1080 IF h>=2^(7-Loop1) THEN
1090 BLOCK b,b,x+Loop1*f-Loop0*g,y+((Loop1*g/4)+Lo
op0*f),d
1100 LET h=h-2^(7-Loop1)
1110 END IF
1120 END FOR Loop1
1130 END FOR Loop0
1140 END DEFine z
```

Christmas Greetings

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MICRODRIVE

THE PROGRAMS

Author	Language	Program Name	Price
1. Giles Todd	B	DIY Assembler	£5

Feaured in the March to June 1985 issues of *QL User*, this complete two-pass assembler will assemble all 68008 code and support the assembler directives DRG, END, EQU, DC and DS.

---

2. Richard Cross	A+O	Mini Monitor	£3

Using approximately 3K of RAM, this handy utility will multi-task on your QL, leaving plenty of room for other programs. Commands include dumping registers, memory — and ASCII — machine code trace, register store, memory move, memory store — byte, word and long — and jumps. Featured in *QL User*, October 1985.

---

3. A Didcock	B	Connect4	£1

A SuperBasic version of the classic four-in-a-row game where counters drop down slots in the vertical board. First printed in *QL User*, September 1985.

---

4. Shergold & Tose	B	Golf	£2

With up to 50 courses of varying difficulty, lakes, rivers, bunkers and trees, this is a fine golf simulation. You decide the power and direction of each stroke, striving for a birdie, eagle or even an albatross. Your scorecard may be saved. This program was printed in the May 1985 issue of *QL User*.

---

5. Williams & Holliday	A+O	Paladin	£5

Written completely in machine code, this excellent *Space Invaders* game was the basis of our games programming series, started in April 1985.

---

6. Richard Cross	M+B	Sprite Animation	£2

This contains two programs from the April 1985 issue. The first is a SuperBasic multi-coloured sprite designer. The second contains machine code routines to animate the sprites on the screen.

---

7. Steve Deary	B	Pacman	£1

A well-written maze game from the March 1985 issue. Almost 20 screens of increasing difficulty, including an invisible maze, make it a very versatile rendition of the arcade favourite.

---

8. Andy Carmichael	B	Family Tree	£3

Based on an article in the August 1985 issue, this is an Archive program and database for setting-up and displaying large family trees.

---

9. James Lucy	L	Composer	£3

Completed in *QL User*, October 1985 this QLiberated program will allow you to compose, play and amend your own melodies. The program will handle sharps, vary tempo, and even specify staccato and legato playing styles.

---

10. Matthew Capp	B	Miners	£2

This interesting simulation, printed in the August 1985 issue, puts you in the role of the NCB, buying and selling coal and mines, hiring and firing miners, and raising or decreasing wages to match economic forces. The object is to be profitable but inexperienced players will find it difficult even to remain solvent.

---

11. P J Smith	B	DIY Adventure	£1

From the February 1985 issue, this skeleton program requires you to slot in the details to create your own adventure programs.

---

12. R Green	B	Othello	£1

This classic board game, printed in *QL User*, August 1985, can be played by one or two players. The display uses a 3D representation of the board. Average response time by the computer opponent is about 15 seconds.

---

13. S J Ackers	S	Touch Type	£4

This program consists of a 13-lesson course for typing-in letters, words and phrases, a 700-word vocabulary, an interactive keyboard display and a fingering chart inas more than 30K of code. Scores are displayed based on the time and accuracy of typing. A reduced version of the program was printed in the August 1985 issue.

---

14. Rob Sherratt	A+O	Fcopy	£4

The first part of this program was printed in the March 1986 issue of *QL World*. The program is an ultra-fast, general-purpose file spooler.

---

15. Alan Prior	B	World Map	£2

From the March 1986 issue, this program will draw a full-screen, multi-coloured map of the world for geography buffs.

---

16. J M Dower	B	Mushyman	£2

Printed in the June and July 1986 issues, this provides speedy SuperBasic arcade action as you munch your way round the screen.

---

17. Tony Quinn	S	CAD QL	£4

CAD design programs are particularly suited to the QL. This version from the September 1986 issue includes features such as rubber-banding and a user-definable symbol library.

---

18. Stuart Campbell	M+B	Attack of the Things	£3

Typical science fiction horror arcade action as yet more nasties descend on harmless QL owners. Featured in the October 1986 issue of *QL World*.

---

19. Karl Jeffery	M+B	Starport 2001	£3

Fast machine code action in this November 1986 version of the *Galaxians* arcade game.

---

20. Marcus Jeffery	S	QL Go	£4

The oriental game of Go is so complex that even mainframe programs are easily beaten by novice players. To the best of our knowledge, this 15x15 version from the April and May 1986 issues is the only one available for the QL.

---

21. J P Hartley	B	Britain	£2

Another program for geography buffs from the November 1986 issue of *QL World*. This is a round-Britain geography quiz.

---

22. KBG Judson	B	Darts	£2

Program of the Month from December 1986. This popular pub pastime requires good hand and eye co-ordination to stop a moving cursor on the on-screen board.

EXCHANGE

KEY					
	B	= SuperBasic	A+B+O	= Assembler and Basic Loader and Object Code
	A+O	= Assembler and Object Code	S	= Supercharged
	M+B	= Machine Code and Basic Loader	L	= QLiberate

23. Neil Taylor S **Window Designer** £2

This useful routine from the February, 1987 issue allows you to design your SuperBasic windows using the cursor keys. It creates a one-line procedure which, when merged into your program, will re-create that window.

---

24. J F Tydeman S **Design 3D** £4

Published in the March and April 1987 issues, this program will allow you to produce 3D screen designs with the minimum of fuss and aggravation.

---

25. D Carmona B **Stellaris** £4

Program of the Month from June 1987. This is an extensive real-time space adventure game against the computer, including economic simulations, lunar landing and superb graphics.

---

26. Robert Noble A+B+O **Video Effects Box1** £3

These machine code SuperBasic extensions allow you to manipulate your screens, save and recall them from memory and clear them in interesting ways. Program of the Month for July 1987.

---

27. H R Pendry B **Pontoon** £3

A graphic version of the classic card game. You play against the computer. Features include changing banker on royal pontoons, accurate betting, five card tricks and so on. Printed in the July 1987 issue of *QL World*.

---

28. Kenneth Cameron B **Picture Puzzle** £2

This short but interesting program from the July 1987 issue sets up an 8 x 8 sliding block puzzle with on-screen graphics. You can select sliding numbers or load your own picture to solve.

---

29. Peter Etheridge B **Bridge** £4

An excellent version of this popular card game. Features include accurate computer bidding, automatic or manual play, replay hands, correct scoring, save and load positions and much more. Essential for card enthusiasts.

---

30. Charles Gerrard B **Psycho** £4

We must apologise but we have had to remove this program temporarily from microdrive exchange. People who have sent orders will have their money refunded and details will appear as soon as the program is again available.

---

31. B Otridge **Crossword** £5

Sold originally as a commercial program, this is the perfect aid for crossword fanatics. The program provides access by word length to a dictionary of about 12,500 words, to help solve those elusive crossword clues. Note: This program requires two Microdrive cartridges.

---

32. Phillip Sproston B **Advent2** £4

SuperBasic arcade adventure with a humorous slant. A variety of rooms, robots and problems will keep you on your toes. Full instructions included.

---

33. Leslie Fahidy B **Clock** £3

This is a complete version of the clock program, described in the June and July 1987 issues of our QL Education series. An on-screen clock can be used to set or read the time.

---

34. E. Bamber **QL Conversion/ Calculator** £2

Comprising weights and measures units conventions and reverse Polish calculation, this excellent utility will convert almost anything to anything. Completely menu-driven, it is very easy to use.

---

35. John Wakefield B **Qwhist** £3

Our August 1987 Program of the Month. It is an excellent implementation of the classic card game, Whist. Designed for one player (south) who partners a computer hand (north) against the computerised east and west opponents.

---

36. Stanley Sykes B **Mail Merge** £1

This cartridge contains very handy utilities providing a mail merge and labeller for Quill files. The cartridge includes a simple demonstration.

---

37. P.G. Ives B **The Double** £4

A large strategy game in which you manage a football team through the four league divisions. The program features buying and selling, team line-up, morale, and so on, through the full league and F.A. Cup season. The cartridge includes full instructions Quill document showing how to play the game.

---

38. Leslie Fahidy B **Education** £2

As part of our series of educational programs, this is designed to help teach the solution of simple linear equations. It is aimed specifically at the 11-plus age range.

---

39. J F Tydeman S **Design 3D** £4

Featured in the March, 1987 issue, this extensive program includes a large suite of graphics and filing utilities for the production of 2D and 3D graphics. It is supplied complete with instructions in the form of a Quill document.

---

40. Santiago Rubio B **Roulette** £3

Our September, 1987 Program of the Month, this is an excellent Spanish/English version of the traditional gambling game. It also includes the Leigh Pattern, a system to break the bank.

---

41. Leslie Fahidy B **Money** £2

Continuing with our series of educational programs, this one sends you on a shopping expedition, calculating prices from shopping lists and trying to determine what coins you will receive as change.

---

42. Neil Davidson A+B+O **Life** £2

A machine code version of the classic simulation of a colony of living cells which survive, reproduce or die according to mathematical rules. Quill instructions included.

See over page for order form.

43. Alan Glassbrook, Ian Swinton — S — Qsquidge — £2

An arcade hunt through an 8×8 grid expandable series of rooms for the necessary nine parts of Squidge's rocket. October, 1987 Program of the Month.

44. David Marsh — B — Compress — £2

Compress is a utility to compress SuperBasic program files into a more compact form without losing the structure of the program. That uses less storage space and means slightly faster loading.

45. Ronnie Davidson — M+B — SuperBreak-out — £2

A fast machine code version of the classic wall game where, using a bat and ball, you must try to break through the wall of bricks. Special features include optional double bats and/or balls.

46. Norman Marks — B — Navigator — £2

To calculate the distance and direction for travel between longitude and latitude positions on the Earth. The program includes an expandable list of cities on points can be input manually. The calculation formulae can be seen from within the program.

47. Richard Clements — B — 3D Maze — £2

Chase round the generated maze, shown in three dimensions, searching for the key to the next level before going through the exit. Extra points can be gained by passing over Point Squares but do not be carried away because it is all against the clock.

48. Jason Price — B — Yahtzee — £2

The November, 1987 Program of the Month was this version of the popular dice game. The on-screen graphics make the two-player program particularly enjoyable and easy to use.

49. Charles Dillon — B — FileBound — £3

A November, 1987 special for *SpellBound* owners. This extension allows users to utilise their SpellBound dictionaries on existing files. An additional feature allows new words to be added to the dictionary.
A compiled version is available from PDQL.

50. Jay Lewington — B — Bank — £4

This well-written, menu-driven program will allow you to keep track of a number of bank accounts, including credits and debits, dated standing orders, printed statements and much more.

51. A Didcock — B — Perspective — £1

Space is big. This program aims to prove it, with a graphical guided tour of the earth, the solar system, neighbouring suns, galaxy and the whole of creation.

52. Simon Quinn — M+B — Space Pods — £3

This 100 percent machine code arcade game was our December, 1987 Program of the Month. Your lone ship must protect six central energy pods against marauding aliens.

53. S M Walker — B — Graphic Writer — £2

Featured in our December, 1987 issue, this is a graphic design program with a difference. In addition to all the usual design commands, your completed picture can be saved as a series of SuperBasic commands for use in your programs.

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54. L Miles **M+B** **Zapman** **£3**
This fast-action, machine code game is of the classic *Pacman* genre. Variable skill levels and a wide variety of maze formats will keep your interest high.

55. Alan Pemberton **B** **Adventure Playtime** **£3**
An extensive adventure where you must complete tasks for the inhabitants of a strange and unusual land. A Quill document gives details of the possible commands and some help in the form of a series of coded messages.

56. Paul Mckinnon **M** **Space Invaders** **£3**
A very fast, very challenging version of what must be one of the best-known arcade games. Includes Quill instructions, ugly descending aliens and protective shields.

57. Timo Salmi **B** **Spelled** **£3**
A complete spelling checker at a very cheap price. The system works on Quill _lis files, checking them against its dictionary of somewhat more than 7,500 words. The dictionary can be expanded automatically as new words are found. This program requires a 512K expansion and occupies two Microdrive cartridges. Quill instructions are included.

58. Nigel Ford **B** **Radar** **£2**
As Control, you must monitor a radar, watching the skies, acknowledging aircraft, scrambling jets to intercept UFOs and, if necessary, lining your sights on and shooting down enemy aircraft.

59. Geoffrey Evelyn **B** **Dungeons** **£4**
As Wizard, Mega-Hero, Super-Hero or Elf, you must explore the *Dungeons*, fighting monsters and collecting treasure in this expansive one- to four-player game. Requires two Microdrive cartridges.

THE ALL-NEW MICRODRIVE EXCHANGE

Microdrive Exchange has always been a popular feature of *Sinclair QL World* and, in our constant efforts to improve the magazine, we are expanding the Exchange to bring you even more quality programs at budget prices.

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There are a number of advantages to the system. First, the service will be much faster, because programs can be copied in advance. Second, rather than having to ensure having the article for documentation, we will be able to supply Quill documents on the Microdrive, if needed, for future programs.

Finally, for all new programs on the Exchange, rather than just receiving the machine code version, the Supercharged version or whatever, we will be able to supply assembly listings, hex loaders and original SuperBasic versions on the same cartridge, so that you can look at and amend programs.

Naturally, this service will require the transfer of more than the usual number of Microdrives but bear in mind that the number of Microdrives you send will be returned with the software. We have reduced the price of Microdrives to £2 per cartridge.

With the new system, we have started to include programs which have not necessarily been featured in the magazine, either because they were too long or because we already had too many listings. Consequently we are now looking for quality programs of any length to feature in Microdrive Exchange. If you have any programs which you feel are good enough, please send them for review. The address and details for program submission is given in The Progs.

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★ We hope to make a library of public domain software available, both for the QL and compatibles using QDOS, and the QL using CP/M. We will be looking out for programs in all languages.

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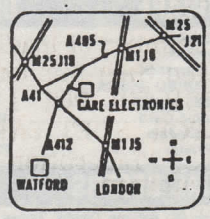

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MEETING 335 10/15 A10:30

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DANCE LESSON 5 FRI P06:00

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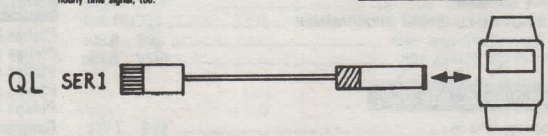
FRANKFURT AM 02:08 42

World Time Function. What time is it now in London? New York? Just input the time differences and afterward you can know the time anywhere in the world, instantly, with this internationally oriented function. Be sure to input the place name, too, in up to twelve characters.

84 10/14 A SUN 10: 08 42

Watch Function. The Wrist Terminal has a full set of Time Keeping functions, including a built-in alarm which will beep at the same time each day and a calendar which will automatically tell you the year, month, and day accurately from now until the year 2020. It has an hourly time signal, too.



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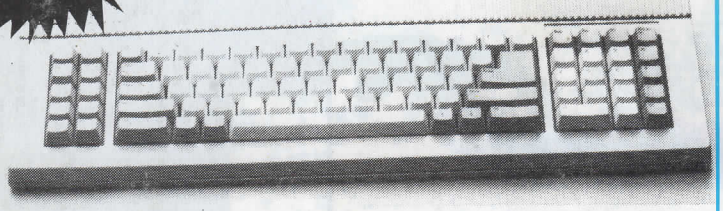

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